the OIL AND GAS JOURNAL

300,000 BARRELS, PENNSYLVANIA'S CRUDE OIL PRODUCTION FOR FIRST SIX MONTHS OF 1944

ginning with the completion of the
Drake well at Titusville, crude
been produced commercially in
lvania since 1859. Oil was struck
well on August 28 of that year,
epth of 69½ feet, and its daily
amounted to about 25 barrels.
the high price of crude (about
r barrel at that time), the success
Drake well stimulated intense ac-
and by the end of 1860, 117
ad been drilled, 73 of which were
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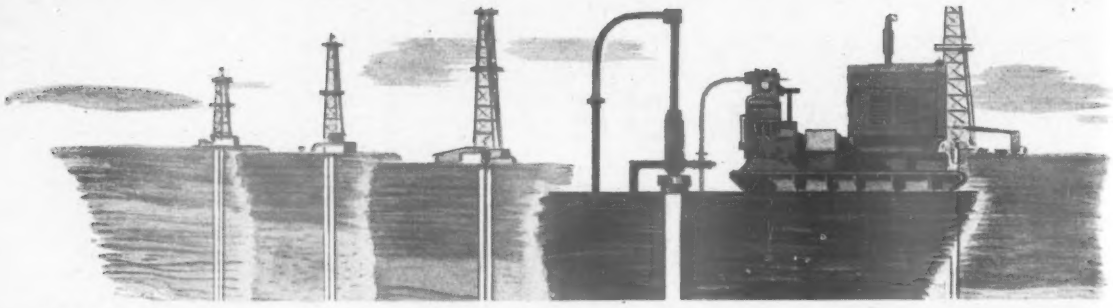

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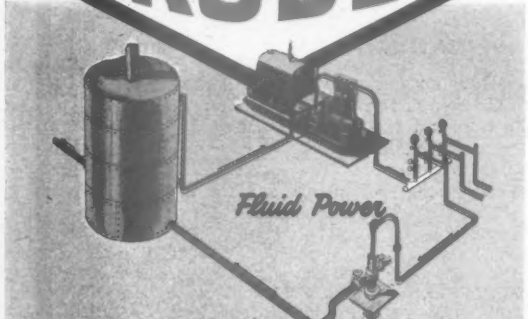

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Trends

Crude-Oil Production
By States—Page 118

CRUDE-OIL STOCKS 221,960,000 bbl. as of November 25—up 529,000 bbl. One year ago 239,761,000 bbl.

GASOLINE STOCKS 79,421,000 bbl. as of November 25—up 680,000 bbl. One year ago 69,229,000 bbl.

RESIDUAL FUEL-OIL STOCKS 62,835,000 bbl. as of November 25—down 466,000 bbl. One year ago 61,735,000 bbl.

GAS OIL AND DISTILLATE STOCKS 47,101,000 bbl. as of November 25—down 916,000 bbl. One year ago 45,449,000 bbl.

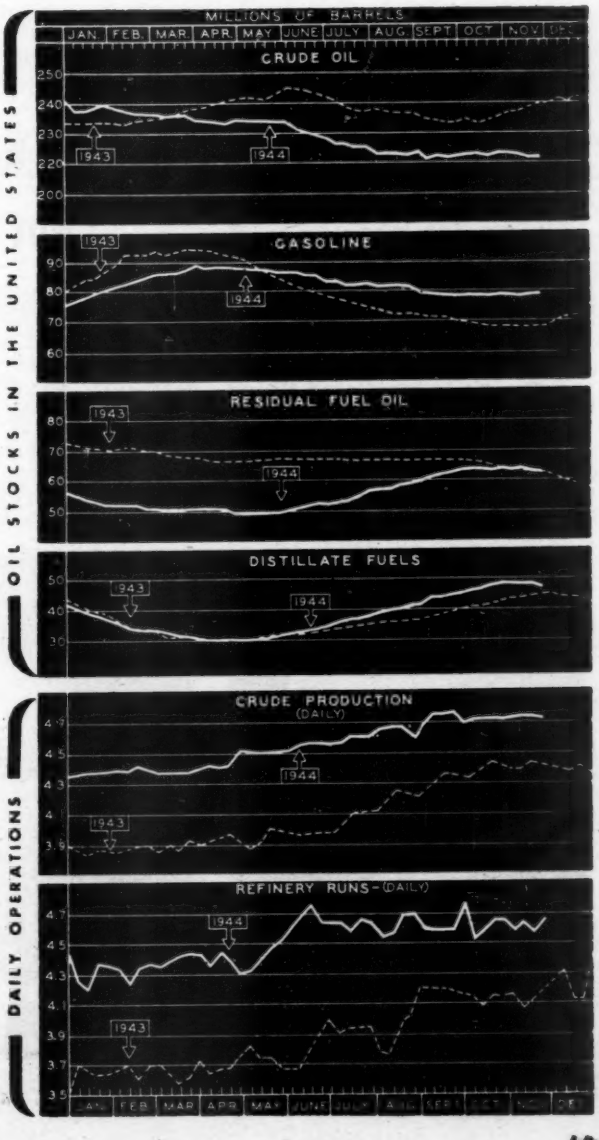
CRUDE-OIL PRODUCTION 4,710,300 bbl. as of December 2—down 23,700 bbl. One year ago 4,395,255.

REFINERY RUNS 4,672,000 bbl. daily week ended November 25—up 105,000 bbl. Year ago 4,282,000 bbl.

SEVERAL weeks ago, when it was apparent that the Russians were about to take over the Romanian oil fields and refineries, the importance of this development in relation to the future oil activities of the United Nations was outlined on this page. It was assumed then that the plans of the armed forces of this country and the British to quickly rehabilitate at least part of the Romanian petroleum facilities with construction units already trained for that purpose, would be carried out. It was planned to start with a few thousand barrels daily and gradually provide the field and plant equipment to maintain an operation of 100,000 bbl. daily, which was the estimated level of field and refinery production under German domination up to the time the Allies began bombing the refineries.

THIS project has not been carried out because the Russian military leaders have not permitted the Americans and British to provide manpower and equipment required to carry on the rehabilitation program. Whether this position means that the Russians will attempt to rebuild the facilities destroyed by bombing and sabotage or whether they expect soon to permit their principal Allies to carry out their plans, is not known. It is pointed out that the Russians have had to rely heavily on this country and Great Britain for equipment and materials to maintain their oil operations, and doubt is expressed that they could furnish the equipment now needed in Romania from her own manufacturing plants. The meager reports available indicate that the destruction of the Romanian refineries was nearly complete with smaller damage to the fields and transportation.

FURTHERMORE, observers are stressing the possible difficulties evolving around Romanian oil after the war ends. The Russian-Romanian agreement provides that Romania is to pay Russia $300,000,000 in commodities over a 6-year period and also compensate other Allied nations for damage done to the property of their nationals. It is pointed out that petroleum is Romania's principal surplus commodity and that agreements may later be entered into which will mean that its surpluses will go to Russia as payments on the financial agreement. Nationals of the United States, Great Britain and Netherlands own all but a small per cent of the Romanian oil.



Connally's Stand Puts Another Strike on Anglo-American Pact

WASHINGTON. — An official prediction that the Anglo-American oil agreement is dead greeted Petroleum Industry War Council as it assembled in Washington this week to formulate its position toward the pact. The prediction came from Sen. Tom Connally, of Texas, chairman of the Senate committee on foreign relations, before which the treaty is now pending for ratification. He issued a brief statement saying:

"The Anglo-American oil treaty now pending before the committee on foreign relations will, in my opinion, never be ratified by the committee. It is my view that the treaty is unfair to the American oil industry and is not necessary for the general welfare. I have been opposed to ratification since it was first submitted to the committee."

The statement was issued without comment Saturday noon, just as the PIWC's committee on national oil policy opened a scheduled 4-day meeting to draft recommendations for language changes which would make the agreement acceptable to the council and the industry generally. The council, meeting December 6, was prepared to devote the major portion of its session to consideration of the agreement.

Connally's statement had the effect of a bombshell in administration circles. Officials of the State and Interior departments declined to comment immediately, but it was apparent that they were astonished.

Only last month Connally had announced that the committee would hold hearings on the petroleum treaty early in the next session of Congress, and the administration was preparing to push for its ratification as soon as expected suggestions were received from PIWC. Officials had high hopes of obtaining from the council suggestions for amendments or reservations which could be accepted by both the U. S. and British governments without impairing the objectives and effectiveness of the treaty.

The future course of action remained in doubt. Earlier administration officials had declared that they would not let the treaty die. It was drafted after two lengthy conferences with British Government delegations, and was the first of a projected series of commodity agreements designed to stabilize postwar international trade.

Connally, of course, was not presuming to speak for the other members of the committee, but opposition of the chairman, who represents the largest oil-producing state in the Union, naturally would influence other committee members, and from the standpoint of practical parliamentary procedure the opposition of the chairman of the foreign relations committee makes it virtually impossible to obtain Senate ratification of a treaty.

Connally's opposition was expected to be interpreted abroad as sounding the death knell of the treaty, since the chairman of the Senate foreign relations committee is considered to be the administration leader on foreign affairs in Congress. In view of this it was considered doubtful that the British would bother to negotiate on amendments unless the requested changes should have strong endorsement from the industry and from Congress.

Hardwicke Contends Agreement Does Not Extend Federal Power

WASHINGTON.—A legal opinion that the Anglo-American oil agreement would not give the federal Government any additional power over the domestic activities of the oil industry or reduce existing powers of the states was presented to the Petroleum Industry War Council and its national oil policy committee here this week by Ralph K. Davies, deputy petroleum administrator. The opinion was prepared at Davies' request by Robert E. Hardwicke, chief counsel of Petroleum Administration for War, in order to answer objections raised by the oil industry.

Hardwicke took the position that a treaty could enlarge the powers of Congress if expressly so written, but that the pending Anglo-American pact does not do so and its language shows that nothing of the sort was contemplated.

The purpose of the agreement, the opinion states, is to deal with international petroleum matters, and even if the International Petroleum Commission should make recommendations regarding domestic operations there would be no obligation to follow them.

Mere recognition of broad general principles considered desirable in the oil business, as stated in the pact, does not constitute an obligation and does not vest any additional powers in the federal Government, Hardwicke declared, and neither does a treaty which requires the use of efforts to accomplish an aim.

The opinion lays great stress on a phrase in the agreement pledging government action "in accordance with their respective constitutional procedures" as meaning recognition by both governments that in this country many legislative powers are reserved to the states and that the

SENATOR TOM CONNALLY

ROBERT E. HARDWICKE

treaty does not contemplate any interference with such distribution of power.

Pointing out that the treaty uses the words "grant reciprocal assurances" instead of "agree" or "obligate," Hardwicke stated that the treaty drafters obviously did not contemplate that the U. S. Government would be obliged to interfere with state authority in carrying out recommendations of the commission.

The opinion concluded with the statement that the agreement would not be useless in the absence of enforcement powers since the accomplishments of the Interstate Oil Compact Commission have been attributed to that body's lack of power to enforce its recommendations.

Summary of Hardwicke's opinion follows:

1. The provisions of the agreement are not selfexecuting.

2. The International Petroleum Commission is authorized to gather data, study the problems, and make recommendations for carrying out the aims and the general principles which are recognized by the two governments, but,

3. The recommendations of the commission are not binding on the two governments or their nationals,

4. While the two governments do not obligate themselves to adopt and enforce the recommendations of the commission, each does assure the other that it will undertake to make effective such recommendations as may be approved by it; however,

5. Applicable laws and concessions contracts are to be recognized, and the distribution of power between the nation and the states is not to be disturbed. Consequently, if a recommendation could not be made effective by the federal Government because the power to act with respect to such recommendation was within the competence of a state or states, then the agreement does not undertake to change such power. In other words, no power is taken from the states and vested in the federal Government so that the federal Government will have power to make effective recommendations which otherwise would require action by a state or states.

It has been argued that if the agreement means what it is here interpreted to mean then the two governments will accomplish little or nothing by the agreement. A short answer to the argument is given by pointing out that in 1935 a number of the oil-producing states, with approval of Congress, entered into an agreement known as the interstate oil compact, which is quite similar in principle to the agreement under discussion. It is still in force. The Interstate Oil Compact announces and recognizes general principles and aims. It provides for the creation of an Interstate Oil Compact Commission which may make recommendations to the states and to operators for carrying out the principles stated in the compact, but there is no power given to the commission to enforce its recommendations, and such power must be exercised, if at all, by each state in accordance with its laws. It has repeatedly been asserted that the lack of power in the commission to enforce its suggestions or recommendations accounts for the good which the commission has done.

National Planning Association Recommendations Are Criticized

SHARP criticism from many elements in the oil industry was leveled this week at recommendations of the National Planning Association which called for importation of 1,000,000,000 bbl. of oil annually by 1950. Suggested imports of oil were a part of a broad report on foreign trade in which the association advocated substantial increases in purchases of various commodities abroad in order that United States industry could reasonably expect to dispose of its surplus production to European, South American, and Asiatic nations.

Proposed imports of petroleum averaging 2,740,000 bbl. daily, it was pointed out by oil industry leaders, would be approximately 60 per cent of current crude-oil production. Receipts in this volume from foreign producing countries would stifle the domestic industry and bring to a halt the essential exploration program.

Ralph T. Zook, president of the Independent Petroleum Association of America, was among the most outspoken critics of the National Planning report.

"Oil reserves which have won this war," declared Zook, "were found because the finders had a market for oil. Nobody looks for a new oil field in order to lock it up after finding it. Under the proposed program, few would try to make new oil discoveries."

If the NPA theory of "conservation of domestic resources" had prevailed in previous years, Zook said, the war would be over with the Axis countries victorious.

German Oil Index Holds At 30 Despite Bombings

NEW YORK. — The desperate effort made by Germany to conserve and protect its petroleum supplies is amplified by reports of Allied experts watching the Nazi output of finished oil products.

Estimates are that the German production index for oil rose from 23 to 30 per cent in October. The index is based on 100 per cent German oil production previous to last April.

The Germans are fighting desperately to maintain and improve oil production and to protect it from Allied raids. The heaviest air defenses in the Reich have been concentrated around oil plants in such points as Brux, near Dresden, Hamburg, Hanover, Harburg and Misburg.

The current offensive against oil is similar to the attack early this year that smashed German fighter plane production and decided the balance of airpower in favor of the Allies.

To counter the Allied assault, the Germans have established repair camps beside all major refineries. Crews are thrown into work repairing bomb damage before the smoke of an air raid clears. Because a major oil plant is spread out over an area of several square miles, the attacks must be sustained if the plant is to be permanently disabled.

Although synthetic oil from coal supplies at least half of the Reich's requirements, Germany has discovered new natural oil fields within the Reich itself since the start of the war, and their production is believed to be considerable.

Mapes Warns of Federal Control Perpetuation

OKLAHOMA CITY.—Sharp vigilance by the industry will be necessary if emergency controls are to be thrown off when the war ends. This warning was sounded here December 5 by Clarel B. Mapes, Tulsa, secretary-treasurer of the Mid-Continent Oil and Gas Association who addressed the Oklahoma Mineral Industries Conference. Mapes said that reconversion of the petroleum industry to peacetime operations presents no basic physical problem.

Not Once Did Tankers Fail

NEW YORK.—"Not once did they fail," said Adm. Chester W. Nimitz, commenting on activities of commercial tanker fleets engaged in transporting fuel for Navy vessels in the Pacific. The commendation was in a letter to Adm. E. S. Land.

Saskatchewan Gas Project

LLOYDMINSTER. — Community Services, Ltd., have announced location, in LSD 12, 24-49-28w3, of the first of a series of tests for gas to be drilled on the Saskatchewan side of the Lloydminster field. The object is to develop gas reserves for projected pipe lines to supply gas to North Battleford and Saskatoon.

Arabian-American Pressing Persian Gulf Construction

by Henry D. Ralph

WASHINGTON. — The Arabian-American Oil Co. is pressing completion of its refinery projects in the Persian Gulf area and conducting a small drilling program while still considering the possibility of constructing a crude-oil pipe line across Saudi Arabia to the eastern end of the Mediterranean Sea, according to information just made available here.

Expansion of the refinery on Bahrein Island, including a 100-octane plant, is virtually completed, giving a crude-oil capacity of approximately 57,000 bbl. per day. At present this refinery is running about 20,000 bbl. per day of crude from wells on Bahrein Island and about 35,000 bbl. per day of Arabian crude barged from the mainland. Construction is starting on a 10-in. submarine pipe line, with ultimate capacity of 50,000 to 60,000 bbl. per day, to bring crude from the mainland to the Bahrein refinery, and this probably will be completed in April.

The old refinery at Ras Tanaru on the Arabian mainland is operating at capacity of 2,700 bbl. per day, producing motor gasoline, kerosene and fuel oil. The new 50,000-bbl. Ras Tanaru refinery, designed to produce 80-octane all-purpose gasoline, is scheduled for completion next summer or fall, depending on transportation facilities available for delivering equipment.

During the past year the company drilled two wells in Saudi Arabia, one producer at Abqaiq, making a total of five producing wells in that area, and a wildcat close to the border of Kuwait which was a dry hole. Rigging up has started for a wildcat north of the Dammam field, and another well will be started soon at Abqaiq.

In addition, the company has been reconditioning wells which were plugged in at the outbreak of the war, and these will soon be producing to the capacity of the Bahrein refinery and in excess of Bahrein Island production which is expected to remain at about 20,000 bbl. per day. There are now 27 producing wells in the Dammam field, and it is estimated that these wells could produce close to 100,000 bbl. per day.

In addition, the company has a number of road-building and water-well projects, both for its own use and for the benefit of nationals of the area where it is operating, and is cooperating with the Government of Saudi Arabia in irrigation projects. Close to 10,000 Arabs are currently employed by the company, and more than 500 Americans, while another 500 Americans are en route or are being recruited.

The company is doing some work looking toward development of agriculture and other natural resources, but prefers to confine its activities to petroleum. Its relations with the government of King Ibn Saud are declared to be excellent, and it is said there are no disputes over royalties or other payments or as to the method of operating the concession. Royalties on crude production amount to a little over 20 cents per barrel.

Study Postwar Markets

Postwar markets for the products of the refining capacity which has been expanded to meet wartime needs are now being studied. Markets for much of the products probably will be found in Asia and Africa through the facilities of The Texas Co. and the Standard Oil Co. of California, parent concerns of Arabian-American.

The company's ability to produce crude in Saudi Arabia obviously will be in excess of its Persian Gulf refining capacity, and to find an outlet for such crude the company is still studying the possibility of building a pipe line to the Mediterranean as a postwar project. Company officials estimate that operating costs of the pipe line would be considerably lower than for transporting crude around the Arabian Peninsula by tanker, including the Suez Canal toll of approximately 18 cents per barrel. Decision on the pipe line may depend in large measure on whether European countries continue their prewar policy of maintaining refineries within their borders and importing crude rather than products.

The crude now being produced by Arabian-American has a gravity between 34° and 38° and contains from 1 to 2 per cent sulfur which is said to be in a rather inert form and does not characterize it as sour crude. It is described as being excellent for making most refined products.

No estimate is available of the cost of this crude, including royalty, loaded on tankers in the Persian Gulf for export, but it is estimated that the figure would be lower than the cost of Caribbean oil f.o.b. tanker, except at Lake Maricaibo, Venezuela. Whether either crude or products from the Persian Gulf could reach North American markets profitably after the war is said to depend on a great many indeterminable factors such as tanker costs, tariff policies, and volume and costs of production in other areas.

Iran Crisis Continues, With Oil Dispute Unsettled

MOSCOW.—The Soviet press reported last week that "the government crisis continues in Iran," where this country's effort to obtain oil concessions resulted in the fall of Premier Mohammed Saed. Tass dispatches, appearing in the leading Moscow newspapers, contained predictions attributed to Iranian sources that even if Premier Designate Bakatu succeeded in forming a cabinet its life would be short. No mention was made of the oil dispute.

Standard of California Gets Venezuelan Concessions

SAN FRANCISCO. — Signing of oil concessions with the Government of Venezuela covering 1,750,000 acres of land on the west side of Lake Maracaibo was announced last week by R. C. Stoner, president of Richmond Exploration Co., subsidiary of Standard Oil Co. of California. The concessions provide for exploration, exploitation and drilling, under the Venezuelan law of 1943, in the districts of Urdaneta and Perija, in the state of Zulia.

Richmond Exploration Co., which is managed by Richmond Petroleum Co. of California, another Standard subsidiary, already is well along in preparations for geological and geophysical exploration. Actual work in the field should be started soon and plans are being made for early exploratory drilling. Approximately 350,000 acres of the total concessions are under water, on the lake bed.

The Lake Maracaibo basin is one of the greatest oil-producing areas in the world, although most of the present production is on the east side of the lake and off the east shore. To date, exploration on the western side has not been as intensive.

THIS WEEK

INTERNATIONAL—Chairman Connally, of Senate foreign relations committee, says British-American agreement will fail to receive ratification. . . . View represents one man's opinion, but chairman's opposition is difficult to overcome in committee. . . . R. E. Hardwicke, chief counsel PAW, issues opinion holding agreement gives no new power to federal Government. . . . ¶PAW materials division reports sharp increase in foreign operations, aids manufacturers in getting necessary steel. . . . ¶Arabian-American Oil Co. pressing Persian Gulf refinery construction, drilling program, and submarine pipe line to Bahrein Island. . . . ¶Richmond Exploration Co. launches exploration program on newly acquired concessions on west shore of Lake Maracaibo. . . Company obtains rights on 1,750,000 acres. . . . ¶National Planning Association recommends importation of 1 billion barrels of oil in 1950. . . . Proposal draws criticism of independent operators, who contend domestic exploration would be stifled permanently. . . .

PRODUCTION—Market demand this month set at 4,741,900 bbl. of crude daily, up 381,500, or 8.7 per cent from last December. . . . ¶Current output drops 23,700 bbl. in daily average, clings above 4,700,000 mark. . . . California, Wyoming, Illinois and Kansas each falling about 7,000 bbl. per day behind PAW quotas. . . .

TRANSPORTATION—Kerosene shipments in drums and boxcars resumed between Gulf Coast and New England. . . . Tank-car shortage is acute. . . . Industry urged to cooperate on speedy loading and discharge of all cars, to shorten turnaround time. . . . ¶American Railroad Association dabbles in pipe-line speculation. . . . Recommends legislation requiring certificates of necessity for oil lines. . . . If pipe lines are divorced from oil companies, railroads might consider entering field. . . .

NATURAL GAS—Short deliveries to Tennessee Gas & Transmission Co. line and to Corpus Christi averted temporarily. . . . Railroad Commission suspends shutdown order in Agua Dulce-Stratton area, pending formal hearing December 18. . . . At issue is failure of some operators to return residue gas.

MATERIALS—WPB allocates steel for first quarter of 1945 approximately equal to estimated requirements, 288,000 tons carbon, 51,000 tons of alloy. . . . ¶Tool joints remain critically short, drill pipe situation easing. . . . ¶Record number of engines delivered in October of more than 500 cu. in. displacement. . . . ¶PAW concentrating efforts on aiding manufacturers in acquisition of raw materials. . . . Previous shortages blamed on failure of manufacturers to properly schedule production. . . .

SUPPLIES—Residual fuel-oil stocks remain unbalanced at strategic locations—but weather is assisting in making adjustments. . . . ¶Heating oils in fair position; distribution hampered by tank-car and tank-truck shortages. . . .

DRILLING—Week's completions rise to 557, up 31 from previous week and 189 higher than same week last year. . . . ¶Twenty-acre spacing authorized in two additional pools, one in Kansas, the other in Michigan. . . . ¶Sixty-two pool discoveries reported in October by PAW. . . . ¶Active rotary rigs totaled 1,790 at end of October, up 57 from previous record. . . .

PERSONNEL—E. J. Bullock replaces W. W. Vandeveer as PAW director of District 2. . . . Bruce K. Brown resigns as assistant deputy administrator, returning to Standard Oil Co. (Indiana) as director of research and development. . . . Jack Steele leaves government service, retiring as chairman of Petroleum Conservation Division and Edward B. Swanson takes on the job in addition to duties as director of research for PAW. . . .

The oldest producing well in the world is the old Buell well, in the Macksburg field, Washington and Noble counties, Ohio. When Barnum Buell struck oil at 495 ft. near the village of Macksburg, in 1862, his achievement stirred wide attention, for he had completed the first "deep-sand well," opening the famous Macksburg 500-ft. sand. The field had been discovered some 2 years before, but production came from much shallower levels. The old Buell well remains a landmark. B. M. Eagler, one of the owners and now 78, still starts and attends the same 12-hp. Pattin Bros. pumping engine that he installed 42 years ago

Senate Committee Implements Natural-Gas Investigation

WASHINGTON.—An investigation of the natural gas industry by the Federal Power Commission has been recommended by the Senate committee on interstate commerce which last week reported out Senate Joint Resolution 92 which had been introduced more than a year previously by Sen. John H. Overton.

Authority for the investigation was strongly endorsed by the FPC but was opposed by Secretary of the Interior Harold L. Ickes on the ground that it would interfere with the war program and should be conducted by the Interior Department on a large scale after the war.

The committee directed the FPC to utilize the services and information of the Interior Department and other government agencies and also the Interstate Oil Compact Commission, and to make an interim report in 6 months and final report in 1 year. An appropriation of $100,000 is authorized. The resolution must be passed by both Senate and House, and funds appropriated in a separate measure, before the investigation can start.

The investigation is to cover the extent of natural-gas reserves in the United States and their present and anticipated depletion; utilization of natural gas, economic waste, competition with other fuels, and chemical and other superior uses for gas; and any other matters which might be helpful to Congress in considering additional legislation to regulate the natural-gas industry.

Problem Is Pressing

The committee declared that the problem is a pressing one and the investigation should be made without delay. Its report included a memorandum from the FPC urging adoption of legislation and policies for conservation of natural gas. It reviewed the controversies over the use of natural gas which have arisen in several of its recent regulatory cases, and declared the commission should have authority to control the sale of gas to industrial users. It repeated an earlier recommendation from FPC to Congress suggesting that the use of natural gas should be restricted by functions. The report noted that about half of the natural gas now produced comes from oil fields and that the conservation and utilization of natural gas and oil are therefore closely interrelated.

Crude-Oil Requirements Set at 4,741,900 Bbl. Daily

WASHINGTON. — Demand this month for 4,741,900 bbl. per day of crude oil was forecast here last week by the Bureau of Mines in its periodical projection of market requirements for petroleum. The December demand is 381,500 bbl. per day greater than in December 1943, an increase of 8.7 per cent.

Total demand for motor fuel this year, the bureau reported, should approximate 739,000,000 bbl., an increase of almost 19 per cent compared with the total in 1943. Direct sales of natural gasoline and imports are estimated at 1,900,000 bbl. for December, making an indicated refinery production of 62,100,000 bbl. for the month.

Benzol and natural gasoline to be blended at refineries are estimated at 6,060,000 bbl. Application of the estimated yield of 39 per cent to straightrun and cracked gasoline production of 56,040,000 bbl. in December gives total crude runs of 143,700,000 bbl., or 4,635,500 daily, a gain of about 9 per cent compared to December 1943.

Engine Builders Must Look Abroad for Designers

NEW YORK. — American engine builders have to look to foreign countries for most of their designers, declared Ralph Miller, chief engineer of development and research for Worthington Pump & Machinery Corp., at the regional educational conference held here recently by Diesel Engine Manufacturers Association. Why, he asked, do "90 per cent of the designers graduated from our own schools wander away from their original profession into other departments, such as sales?"

"Because," answered Prof. Neil P. Bailey, of Rensselaer Polytechnic Institute, "our American boys are pretty keen on which side their bread is buttered. They find they can draw higher salaries in fields other than designing."

Gordon Lefebvre, president of Cooper-Bessemer Corp. and chairman of the meeting, added that in Europe, designers generally are accorded more credit and prestige.

Massachusetts Institute of Technology's spokesman, Prof. C. Fayette Taylor, said that the films and slides some of the manufacturers offer the schools were too elemental and too sales-slanted. "What we would really like to have," he said, "is actual test data on engine performance—graphs and curves—showing air consumption, fuel consumption, and the like. We could thus compare theory and practice."

The manufacturers agreed that the type of graduate engineer most useful to them was the man with a broad, basic education in mechanical engineering, with enough machine designing and shop work to enable him to understand the nature and operation of a diesel engine. Specialization in diesels fitted better into the postgraduate picture, they agreed.

Harvey T. Hill, DEMA's executive director, foresaw a government postwar surplus of diesel engines amounting to perhaps a billion dollars.

Kansas-Oklahoma Oil Men Reelect Old Officers

Frank M. Porter, Fain-Porter Drilling Co., Oklahoma City, was reelected president of the Kansas-Oklahoma division of Mid-Continent Oil and Gas Association at the annual meeting of the executive committee in Tulsa last week. Clarel B. Mapes, secretary of the division and of the general association, was reelected also as were the other officers: First vice president, L. G. Owen, attorney, Tulsa; vice president for western Kansas, E. B. Shawver, Wichita; vice president for eastern Kansas, Carl Weiner, Chanute; vice president for northern Oklahoma, A. W. Ambrose, Cities Service Oil Co., Bartlesville; vice president for southern Oklahoma, Lloyd Noble, Noble Drilling Corp., Ardmore; vice president for western Oklahoma, W. R. Wallace, Magnolia Petroleum Co., Oklahoma City.

Owen, who retired recently as general counsel of The Carter Oil Co., was made a life member of the division. Thirty-three oil men of Oklahoma and Kansas were chosen directors of the general association and 163 were named members of the executive committee of the Kansas-Oklahoma division for the ensuing year.

Bainbanov Succeeds Seden

MOSCOW.—I. K. Seden has been relieved of his duties as people's commissar of the oil industry, and he has been succeeded by Nikolai Konstantinovich Bainbanov, according to an official announcement in the Russian press. No explanation was available from official sources. Soviet economists frequently have described the oil industry as a vital factor in postwar development plans.

Texaco and American Cyanamid Organize Jefferson Chemical Co.

NEW YORK. — Formation of Jefferson Chemical Co., for the development and manufacture of chemicals from petroleum hydrocarbons marks another advance in the rapidly growing petroleum chemical industry. This company, headquartered at 30 Rockefeller Plaza, is owned jointly by The Texas Co. and American Cyanamid Co. It will manufacture such various chemicals from petroleum and natural gas as may be in demand by different consumer industries, according to announcement by W. S. S. Rodgers, chairman of the board of directors for The Texas Co. and vice chairman of the new company.

This development has been actuated, apparently, by the rapid and far-reaching strides made in the petroleum chemical field during the present war and by the prospects for continuance and increase in the activities in this field in the postwar era. This field of chemical development already includes the commercial production of methyl (wood) alcohol, ethyl or "grain" alcohol, several other alcohols of industrial or commercial importance, glycerin, glycols, ketones such as acetone, formaldehyde, acetic acid (vinegar), chlorohydrocarbons, which are very important in different chemical syntheses and in commercial products such as disinfectants and insecticides, tetraethyl lead for antiknock improvement of motor and aviation fuels, and a host of other products.

Widening Field in Prospect

Synthetic rubber intermediates, plastic intermediates and the plastics themselves offer a widening field, the limits of which have not yet been estimated, many of the materials in which are producible from petroleum and natural gas hydrocarbons as raw materials. The particular products to be made by the new company have not been announced.

"The importance of petroleum and petroleum gases as raw materials for the production of chemical substances is being increasingly appreciated," said Rodgers. "Great strides have been made in this field during the war. Many constituents of petroleum gases which were formerly byproducts at oil refineries are now in demand as raw materials."

The plants to be operated by this company will be built adjacent to the various Texas Co. refineries, it is announced.

Directors of the new company are Rodgers, W. B. Bell, Harry T. Klein, H. L. Derby, M. Halpern, K. F. Cooper, R. J. Dearborn, M. C. Whitaker, W. M. Stratford, R. C. Gaugler, W. E. Kuhn, and L. C. Perkinson. Officers are W. B. Bell, chairman of the board; Rodgers, vice chairman; H. L. Derby, president; P. M. Dinkins, vice president and general manager; R. J. Dearborn and M. Halpern, vice presidents; K. C. Towe, treasurer; W. P. Sturtevant, secretary; W. G. Elicker, assistant secretary and assistant treasurer.

Lacy to Construct Plant In Heidelberg Field

JACKSON.—Roger Lacy, of Longview, Tex., will begin construction of Mississippi's largest refinery not later than January 1, it is announced. The plant will be in the Heidelberg field. Gov. Thomas L. Bailey referred to the project as "the biggest oil news in the state since discovery of the first well." Site and capacity were not disclosed, but following a conference with Lacy, the governor said he was confident the refinery would be larger than the only other one in the state, that of Southland Refinery Co., at Yazoo City, which has a daily capacity of 3,500 bbl.

Nebraska Standard Merged With Parent Company

CHICAGO.—Business of Standard Oil Co. of Nebraska was combined with that of Standard Oil Co. (Indiana) on December 1, H. W. Pierpont, president of the Nebraska company, announced. The change was more one of form than substance, Pierpont stated. Standard of Indiana was sole owner of Standard of Nebraska, operating it as a marketing subsidiary. To simplify the corporate setup and obtain for the Nebraska organization the benefits of direct participation in the larger organization's activities, Standard of Nebraska properties and personnel have been joined with those of the parent company.

The Nebraska organization is now a sales unit of Standard of Indiana's western division. Headquarters continue at Omaha in the present offices and with the same staff, except for the retirement of Pierpont himself at his own wish in accordance with plans he announced some time ago.

J. H. Hay, who was vice president of Standard of Nebraska, is manager of the Omaha division under the new setup and J. M. Terrell, formerly a sales manager at Des Moines, is assistant manager.

T. W. Hughes, treasurer, continues in charge of the accounting staff and activities with the title of office manager.

The Omaha staff and the employe personnel throughout Nebraska may continue in their jobs as heretofore. As employes of Standard of Indiana the Nebraskans will retain benefits of several employe plans operated by the Nebraska company, and become beneficiaries of similar plans provided by Standard of Indiana.

Standard Oil Co. (Indiana) was incorporated in 1889 for the building of a refinery at Whiting, Indiana. Its activities soon spread into marketing of petroleum products and into other states. For some 35 years it has been a principal marketer in states surrounding Nebraska.

Pierpont joined Standard of Nebraska in 1917 as purchasing agent. He became secretary and director in 1919 and secretary-treasurer later the same year. He was made vice president in 1929 and president in 1937.

Hoosier Gas Corp. Bought By Two Dallas Men

DALLAS. — Purchase of Hoosier Gas Corp., of Vincennes, Ind., by D. Gordon Rupe, Jr., and R. A. Ritchie, both of Dallas, was announced last week by Rupe, who said the consideration was "approximately $1,000,000." The Hoosier properties, consisting of facilities in Vincennes, Richmond and Princeton, Ind., were owned and operated by Stone & Webster Service Corp., New York. The new owners have taken possession, with E. J. Meade as president of the company.

Louisiana Allowable Set at 394,816 Bbl. for December

BATON ROUGE.—The December oil allowable for December has been set at 394,816 bbl. by the minerals division of the State Conservation Department. This is a slight drop from the November figure, which was 395,500.

New allowables by districts are: Houma 62,594, Lafayette 112,039, Lake Charles 67,799, New Orleans 76,701, Monroe 33,421, Shreveport 42,262. Larger field allowables included: Erath 18,361, Lafitte 11,824, Paradis 10,138, Nebo-Hemphill 10,474.

Small-Business Committee Calls For OPA Oil-Price Study

WASHINGTON. — An immediate study of the costs of crude oil production looking to an over-all increase in price ceilings has been urged on the Office of Price Administration by the Small Business Committee of the House.

The committee declared that 90 days should be sufficient time for such a study, to be taken by a uniform cost data questionnaire submitted to a representative sample of the producing industry. Special attention should be paid to the costs of small operators and pools with declining production, and ceilings should cover amortization of discovery and development as well as operating costs, committee declared.

In submitting the report to the House, Chairman Wright Patman of Texas charged that the OPA oil-price policy is fostering a trend toward monopoly and is driving the independent producer out of business. He implied that OPA is relying on obsolete and insufficient statistical data and is using dilatory tactics to stall off a general increase in crude prices. Exploration is the normal function of the independent but OPA refuses to permit ceiling prices or premium price subsidies sufficiently high to encourage further exploration by independents, he declared.

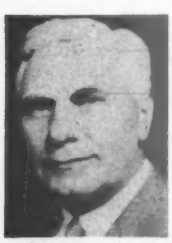
The report asserted that OPA has never appointed an industry-wide advisory committee and has refused to deal officially with an association of independent producers. It called on OPA to appoint a nation-wide advisory committee giving due representation to independent producers.

Implying that a cost study will show the need for higher crude prices, the committee declared that an increase should be over-all and on a nation-wide basis because of the impracticability of granting price increases to selected producers, and that the premium-price subsidy should be retained for stripper and high-cost wells with costs still above the increased ceiling.

A similar study should be made of the operating costs of refiners, the committee said, and to prevent increasing product prices to consumers OPA should grant a subsidy to marginal cost refiners whose profits might be adversely affected by increased crude prices.

Bullock Takes Vandeveer's Place as District 2 Head

CHICAGO. — Edward J. Bullock, of Chicago, was appointed director-in-charge of District 2 (Midwest) for Petroleum Administration for War last week by Harold L. Ickes, petroleum administrator, to succeed W. W. Vandeveer, who resigned to return to private business. Since September 1942 Bullock had been director of facilities security in the district. Vandeveer is president of Allied Oil Co., Cleveland.



E. J. BULLOCK

"Bullock has done an outstanding job," said Ickes. "The fact that he has been associated with PAW, coupled with his long years of administrative experience as one of the leading oil men in the Midwest, makes him an ideal choice as director-in-charge of District 2 office."

Bullock has had some 50 years' experience in the oil business. Born in Cleveland, he received his early education in Ohio. Immediately after leaving school, he joined Standard Oil Co. of Indiana as an office boy. He remained with the organization 47 years, rising in rank through the sales, purchasing, and administrative departments until his appointment in 1922 as a vice president and member of the board of directors. He retired in 1939.

In accepting Vandeveer's resignation, Deputy Administrator Ralph K. Davies expressed himself as being "most disappointed that it is necessary for you to leave the petroleum administration at this time. On behalf of Administrator Ickes, as well as for myself, I express not alone regrets, but deep appreciation for your splendid contribution, together with the wish for your further success."

Jack Steele Resigns Oil Conservation Post

WASHINGTON. — Jack W. Steele has retired as acting director of the Petroleum Conservation Division of the Department of the Interior and has been succeeded by Edward B. Swanson, who will serve as acting director in addition to his present duties as director of research of the Petroleum Administration for War. Prior to the war Swanson was associate director of the conservation division.

The Conservation Division has been relatively inactive during the war, having only two employes in Washington at present. Steele was also chairman of the Federal Petroleum Board with headquarters in Texas, and an appointment has not yet been made to that post.

Steele has served the Department of the Interior for approximately 20 years in the Geological Survey and the Petroleum Conservation Division, as well as in the position of chairman of the Federal Petroleum Board, with headquarters in Texas. Owing to reasons of health and personal plans, he requested voluntary retirement, for which he has been eligible for some time, to be effective upon the termination of his unexpired accumulated leave.

Surplus Fuels and Lubes To Be Held to Minimum

WASHINGTON. — The fuels and lubricants division of Office of the Quartermaster General has set up its own demobilization branch in order to hold to a minimum any surpluses on the day when the war is won and during the interim.

In charge of the branch is Maj. G. H. Schoenbaum, who, before entering the Army as a reserve officer in 1940, was special government representative for Standard Oil Co. of New Jersey in Washington. Major Schoenbaum was assigned to the fuels and lubricants division in Washington for a time, before being placed in charge of the division's West Coast office in San Francisco. He has now been brought back to Washington to head the new branch.

The primary job of the new branch is to insure that each of the operating units of the division has a comprehensive plan for the period between now and the cessation of hostilities in Europe, during the all-out continuation of the war against Japan, and for the postwar period.

Adequate personnel is to be kept in the parent office to assure that fuels and lubricants functions are maintained even after many military and civilian employes have gone back to private industry.

Cessation of hostilities in Europe will necessitate complete replanning of shipments for Europe, even to the point of halting tank cars and other shipments en route, and rerouting them to other points. At the same time, refineries filling War Department fuel and lubricants contracts may be called upon to curtail their production of certain products and concentrate on the production of certain others.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

After Three Years

THE day after Pearl Harbor this page concluded: "The conflict starts with the oil industry prepared to do its part. It is the job of operators to keep it that way." It is fitting now on the third anniversary of this greatest of all wars to stop for a moment and see how well oil operators have accomplished their task.

Preparedness was not a happenstance. Many operations had been expanded throughout 1941 and earlier. Fortunately, research, development, and engineering laboratories had been working overtime to gain the "know how" which later was to be applied to large-scale operations overnight.

Domestic crude-oil production last week compared to the week which included Pearl Harbor was 571,300 bbl., or 13.7 per cent greater. The percentage growth in natural gasoline and condensate has been even more impressive. Refineries which operated at 86 per cent of capacity in late 1941 are now 97 to 98 per cent. Crude runs to stills for comparable weeks have been increased more than 700,000 bbl. daily, or 18 per cent.

These supply data should be considered along with the figures covering drilling operations. In 1941 up to December 6, 29,376 tests had been drilled in this country and 30,157 in the corresponding period of 1940. In contrast, under governmental regulations only 39,166 tests were drilled the first 11 months of 1944 and 1943—a 35 per cent decrease under the two previous years.

All the memoranda that have come out of Washington in explanation of this discrepancy between drilling and production do not alter the fact that this has not been a sound foundation on which to base emergency petroleum operations any more than it would be under normal conditions. This "getting by" policy in exploration and exploitation will yield unwanted dividends should the war be prolonged, and there will also be a payoff in the postwar period.

Total figures reveal only a part of what has taken place since this country became an active participant in the war. Production of aviation gasoline, which at the start of the war was less than 1 per cent of the refinery yield, is now around 12 per cent and will be increased early next year to 15 per cent.

Production of butadiene from petroleum, hardly more than an experimental operation when the Japs took over most of the nation's natural-rubber supplies, is now the major factor in synthetic-rubber operations, accounting for more rubber than was consumed yearly in this country during the late thirties. Through the manufacture of toluene the petroleum industry has become a direct factor in warfare. The output of one refinery is credited with supplying the toluene for explosives used in every second bomb dropped on the enemy since Pearl Harbor.

The many other accomplishments are generally known. Through the construction of two mammoth pipe lines and other facilities PAW was able to announce last week that shipments of petroleum war products to the East Coast for further movement to Europe had increased 500,000 bbl. daily over a year ago.

The predictions that the European war will end this fall are behind us. Today's outlook does not point to an early victory. A careful consideration of what has been done in petroleum up to now by operators acting alone or collectively will be helpful in solving greater problems ahead.

Sixty-Two Pool Discoveries Are Reported During October

WASHINGTON. — There were 329 exploratory well completions made during October resulting in 62 pool discoveries according to the report of the Petroleum Administration for War, production division, submitted to the production committee of the Petroleum Industry War Council this week.

Texas accounted for 117 completions, Kansas 39, Illinois 26, Oklahoma 25, Kentucky and California 22 each. The discoveries were in 14 states, 41 being oil and 21 gas, but from present indications none was of outstanding importance.

Total wells drilling on November 1 amounted to 3,748, an increase of 6.5 per cent over the former peak in 1941. There were 1,790 rotary rigs running in October compared with 1,733 in September, the increase being due largely to easing of repair and replacement parts which has made possible rehabilitation of old rigs. However, the number of rigs is still insufficient to meet the demand in areas of intensive development.

Because of the necessity of limiting the use of high priority ratings to the procurement of materials for maintenance and repair only, the division is contemplating a direction to P-98-B requiring operators to obtain prior approval by district directors of materials before applying AA-1 rating to certain specific items of drilling equipment as MRO materials.

The report disclosed that the War Production Board tabled a request from the industry, through PAW, for an increase in mill stock of oil-country tubular goods, the reason being that mill facilities are needed for shells, bombs and rockets.

A tentative agreement has been reached with WPB for priority controls following victory in Europe under which P-98-B will be revised to provide extendable priorities ratings for acquisition of material to be used in conformity with PAO-11. This means that suppliers will be able to obtain replacements by extending priority ratings to the manufacturer, who in turn can extend them to raw materials.

The report also revealed that the WPB has allotted 288,000 tons of carbon steel and 51,000 tons of alloy steel for petroleum production operations and MRO requirements for the first quarter of 1945. These quantities meet the request of PAW to fulfill the first quarter drilling program.

20-Acre Spacing Approved In Deep River Pool

CHICAGO. — The Petroleum Administration for War last week authorized operators in the Deep River pool of Arenac County, Michigan, to use materials to drill wells to the base of the Dundee dolomite zone, without applying for special exception, provided each well was located on one-half of a quarter-quarter section in which all separate property interests had been consolidated and the well was located at least 330 ft. from the property line and 660 ft. from the nearest drilling or producing well, with no more than two wells located on any quarter-quarter section.

The new rule conforms to the spacing pattern now in general use in the field and relieves the operators of the necessity of getting an exception for each well. The Dundee is topped at between 2,750 and 2,800 ft. in most wells in the field. Deep River is one of the most active and prolific pools in Michigan, with initial productions as high as 150 bbl. per hour potential flow being recorded.

Nation Can't Fill Own Oil Needs on Sound Basis

NEW YORK.—This country has reached a point where, observing sound rates of production, it no longer can fill its own normal oil needs, declared Benjamin T. Brooks, petroleum engineering consultant, last week, addressing the annual meeting of American Society of Mechanical Engineers.

At present the United States is supplying its own needs, or most of them, but by production rates which Brooks said are too fast, for when oil is removed from a pool too rapidly, the consequent decrease in gas pressure is so great that part of the oil becomes irrevocably lost.

"Present rate of production, an all-time high made necessary by the war demands is in excess of the proper or economic optimum of most American fields," Brooks said. "Although no one can say accurately what the extent of damage to the fields now is and what the loss of net ultimate production will prove to be, certainly the heretofore estimated figure for known reserves will have to be revised downward."

The speaker predicted that the United States will need increasing oil imports to supply its normal needs as contrasted with its present war requirements. He pointed to the serious decline in discovery of new fields and quoted A. I. Levorsen, oil geologist, as declaring that in California exploratory drilling had reached an all-time high and the volume of newly discovered oil an all-time low.

20-Acre Spacing for Butler Co., Kansas, Pool Allowed

CHICAGO. — A 20-acre spacing pattern for the Kramer-Stern pool in Butler County, Kansas, for depths not exceeding 3,200 ft., was announced this week by C. C. Brown, director of production, Petroleum Administration for War. The new ruling provides that each well must be located within 30 ft. of the center of the southeast quarter of a quarter-quarter section, or within 30 ft. of the northeast quarter of a quarter-quarter section. All other provisions of Supplementary Order 8 to PAO 11 remain in effect.

Order Penalizing Six Gas Producers Is Suspended

AUSTIN. — The Texas Railroad Commission last week suspended until December 18 its order previously issued severing pipe-line connections to wells operated by Agua Dulce Co., Chicago Corp., Gulf Plains Corp., L. M. Lockhart, United Gas Pipe Line Co. and Union Producing Co. and canceling all tenders on products obtained from gas produced in the Agua Dulce and Stratton fields in Nueces, Jim Wells and Kleberg counties.

Suspension of the order, which, it was said, would have cut off the gas supply for Corpus Christi, was granted on application of Chicago Corp. and Gulf Plains Corp.

The penalizing order was issued, the commission said, because operators were not repressuring or returning gas to sands as directed by an August 28 directive which, they said, was intended to conserve and prevent waste of gas.

Three of the six companies affected were disregarding the shutdown order, James Young, attorney for Lockhart, said, "because the commission did not realize the extent to which Corpus Christi would be affected."

Members of the commission expressed the opinion that some formula might be worked out after the December 18 hearing whereby gas may be produced from the sands specified and marketed as fuel, but that if the commission is not so convinced it will renew the shutoff order.

First Quarter Steel Allocations Equal Estimated Requirements

WASHINGTON. — The War Production Board has allotted raw materials for the various branches of the petroleum industry for the first quarter of 1945 practically equal to the estimated requirements, the Petroleum Industry War Council was informed by Claude P. Parsons, director of materials of the Petroleum Administration for War in his regular report to the Petroleum Industry War Council.

These estimates included an increase over the current quarter in proportion to the expected increase in petroleum operations needed to meet the demands of the war and essential civilian use.

A feature of the report was a series of charts showing the use of materials by the oil industry during the past 2 years with projections for the future, giving a graphic picture of the industry's problems regarding materials.

The greatest source of difficulty, he said, arose from the steady increase in the number of rotary drilling rigs in use following the low point in the early days of the war when the industry suffered from the feeling that it was only necessary to crack a valve and obtain all the oil that might be needed. As a result manufacturers of supplies did not expand their facilities sufficiently and many of them are engaged in war contracts. The unprecedented number of rigs in use and the anticipated further increase will create growing problems in obtaining supplies and there is also an abnormal demand for repair parts and replacements. The division is working constantly with manufacturers on this problem, offering assistance in obtaining raw materials and machinery.

Misunderstanding Prevails

Another factor which has unbalanced supply is a misunderstanding regarding the use of priority ratings, Parsons said. In order to eliminate this part of the problem the division has decided to require countersignature of district offices on purchase orders carrying AA-1 rating for complete parts or units of rigs for replacements. However, an automatic AA-1 rating, without countersignature, will continue for repair parts to be used in repairing complete parts or units which have been in operation on an existing rig. Complete new rigs or complete parts or units to be used to rehabilitate old rigs which have not been in operation will carry an automatic AA-2X rating without countersignature. The division has also taken steps to correct the dislocations in present schedules of manufacturers so that existing rigs will have their proper place in the schedules.

The manufacturing problem will be further complicated in 1945 by the foreign petroleum programs which are also expanding, Parsons warned, adding that this has also been called to the attention of the manufacturers so that by close cooperation the problem may be minimized.

The most critical item at the moment is tires and heavy-duty trucks, he said. In spite of a top civilian priority for the industry, tremendous military demands and manufacturing shortages are playing havoc with supplies, but the division will attempt to get special consideration for emergencies called to its attention.

Parsons' report further stated:

Drilling engine deliveries improved during October, when 232 engines of more than 500 cu. in. displacement were delivered. This is the largest delivery during any month of the war, comparing with 179 in September and with the previous high of 203 in July of this year.

Tool-Joint Deliveries Necessary

Tool joint deliveries are increasing although not yet in proportion to the increased demand. Production is being steadily increased as new machinery arrives and other facilities are completed which are part of an expansion program started several months ago by three of the leading manufacturers. All of the machinery scheduled in this expansion will be delivered by March and the fully expanded production will be realized shortly thereafter. October production of tool joints was 34,521 as compared with 29,675 in August, 27,388 in June and 25,107 in April.

The drill-pipe situation will improve with the increase of tool joints. There is more drill pipe being produced than is being worn out and the situation will ease considerably when the rate of starting new rigs begins to slow up.

Rock bits are becoming extremely critical again but PAW is assisting manufacturers by expediting new machinery for increased production.

Expediting of machinery and critical components for manufacturers is the most pressing need at this time and although other activities have decreased we are concentrating our efforts along this line. As it takes especially qualified men, we have procured the services of several suitable men from the petroleum industry through the Petroleum Equipment Suppliers Association, for which we are very grateful.

Tubular goods may become a serious problem in the first and second quarters with the increasing military demand and the increasing domestic and foreign petroleum requirements. With the cooperation of the steel mills and the pipe division of the War Production Board PAW will try to avoid a serious shortage. A lot depends upon the unknown factors in the military outlook.

Consistent with the policy to relax restrictions when materials conditions permit, the limitations in PAO-11 and PAO-15 have been raised from $10,000 to $25,000, which means that operators do not need PAW authorization to use up to $25,000 worth of materials in operations embodying pressure maintenance, cycling, gasoline treating, natural-gasoline recovery plants, natural-gasoline gathering lines, crude-oil gathering lines, and for construction purposes in refining operations.

The redistribution program, having served its primary purpose, has been revised and now applies only to tubular goods.

Bruce Brown Resigns as Deputy Administrator

WASHINGTON. — Petroleum Administrator Harold L. Ickes has accepted the resignation of Bruce K. Brown as assistant deputy administrator, effective this week.

Brown returns to Standard Oil Co. (Indiana) as general manager of research and development. Brown has been with PAW since November 1941 and has had particular charge of the 100-octane gasoline program.

Stanolind Ordered to Reinstate 43 Employes

DALLAS. — Stanolind Oil & Gas Co. last week was ordered to reinstate 43 oil field employes involved in a work stoppage last July. The regional War Labor Board, acting on instructions from the national board, ordered the men reinstated as of July 30, the date on which they offered to return to work.

Involved in the dispute were union demands for removal of a company supervisor and transferral of a worker to another field.

Railroads Consider Pipe-Line Field

LEGISLATION requiring that certificates of necessity be obtained for construction or extension of crude-oil pipe lines is recommended by a subcommittee of American Association of Railroads in its report on pipe-line transportation. The report declares that if ever there is to be equality of regulation applying to all forms of transport, pipe-line transportation may have to be separated from petroleum production and marketing. In that event, the report continues, the railroads should consider the "advisability and the economy of entering the pipe-line transportation business."

"The railroad industry should not now enter the field of pipe-line transportation of crude or refined petroleum products," says the report. "The principal reason therefor is the fact that pipe-line transportation is so closely allied with the integrated operations of the oil companies that no independent transportation agency could give as satisfactory service to the oil companies as they now secure from pipe lines which they own or control. Should the oil companies hereafter be required to divorce transportation operations from production, processing and marketing operations, the railroad industry should then consider the advisability and the economy of entering the pipe-line transportation business."

Tank-Car Shortage Worst Ever, Says ODT

WASHINGTON.—Shortage of tank cars has compelled Petroleum Administration for War to resort again to the use of steel drums for shipment of kerosene from Gulf Coast refineries to East Coast destinations. Also rising military demand for overland oil transportation has brought the boxcar back into service for moving civilian oil products. Withdrawal of tankers from coastwise runs has been another factor in an acute scarcity of tank cars.

Col. J. Monroe Johnson, director of Office of Defense Transportation, issued a warning last week, urging the Government, railroads and industry to adopt measures to meet a critical situation.

The country needs 15,000 new tank cars, said Johnson, but they are not obtainable. That means that more efficient use of those already in service and swifter turnaround must provide the major sources of remedy.

Referring to a tendency in the oil industry, as well as in the Army and Navy, "to reduce transportation costs by utilizing lower cost facilities," Colonel Johnson pointed out that the time "is not opportune for this change, and every facility, regardless of comparative cost, must be utilized if we are to perform the transportation required."

Recheck of all sources of supply was urged on persons in charge of procurement of petroleum products, "so that they can be certain they are using the source nearest to the point of consumption that will meet requirements." Where a 7-day week and a 24-hour workday are not now in force, such a schedule, it is insisted, must be adopted immediately.

To railroad presidents Colonel Johnson wrote that the need for tank cars can be "supplied only by better utilization and faster movement of the existing fleet. In the past several months tank-car turnaround times have lengthened. We must speed up these cars."

Saying that "permits to ship petroleum and its products in tankers for distances less than 200 miles, would be screened more carefully than ever before," Colonel Johnson asked the heads of oil companies to be certain there were no other means of transportation available—regardless of cost—before requesting such permits.

Wiess Urges Cooperation In Transportation Crisis

HOUSTON.—A plea for cooperation in the most efficient utilization of all means of transportation in the movement of oil and oil products was issued last week by H. C. Wiess, president of Humble Oil & Refining Co. and chairman of the Petroleum Administration for War's committee on supply and transportation in District 3.

"The demand for petroleum products has reached unprecedented levels due to the magnitude of the effort by the United Nations to bring the war to a successful end at the earliest date," Wiess said.

"The petroleum industry is prepared to meet all of the military and essential civilian demands, but it will require the most efficient use of tank cars, pipe lines, and barges to deliver the goods where they are needed."

Referring to the action of Office of Defense Transportation in fixing 200 miles as the minimum distance for which tank cars may be used in movement of oil products, Wiess said:

"This places a greater burden upon the limited supply of transport trucks available, but the industry can handle the necessary volume by continuing operation of all types of automotive equipment on a 24-hour basis, 7 days a week. Shippers and consignees must load and unload tank cars and trucks without delay."

Gulf Coast Gasoline Stocks Record Slight Decrease

HOUSTON.—Stocks of all grades of gasolines and naphthas in tanks of Gulf Coast Refiners Association members decreased 45,460 bbl. during the first half of November and were reported at 1,544,365 bbl. A year ago total gasoline stocks were 1,451,522 bbl. and 2 years ago were 2,255,556 or 711,191 more than the present inventory.

Automotive gasoline stocks considered alone totaled 576,498 bbl. on November 15, an increase since November 1 of 51,918 bbl. The current stockpile represents only 43 per cent of the 1,328,577 bbl. of automotive gasoline reported November 15, 1942.

Kerosene stocks totaled 204,552 bbl., an increase of 13,975. Diesel gas-oil stocks November 15 were 222,564 bbl., an increase of 70,791. Other grades of gas oil decreased 64,602 bbl. to 1,056,877 on November 15. These stocks last year were 287,000 bbl. less, but 2 years ago the same group of refiners carried 1,661,086 bbl. of various gas oils and 609,421 bbl. of diesel gas oil, practically 1,000,000 bbl. more than the November 15 inventory.

Stocks of heavier fuel oils decreased. No. 5 fuel oil dropped 33,489 bbl. to 609,176, and Bunker C fuel oil fell 61,622 to 468,580.

Total stocks of all products at the plants of the GCRA group were reported at 4,106,114 bbl. November 15, a decrease of 120,407 during the first half of the month. A year ago total products totaled 3,425,955 bbl. and 2 years ago 5,725,673, then considered about normal for that time of the year.

Crude-oil runs to stills of 122,772 bbl. daily were 87.7 per cent of rated operating capacity and represent an increase of 23,872 bbl. daily in comparison with operations at 81.4 per cent of capacity a year ago.

Duncan Refinery Workers To Hold Election

WASHINGTON. — Employes of Associated Refineries, Inc., Duncan, Okla., are to hold an election within 30 days to determine whether their representative in collective bargaining shall be the International Union of Operating Engineers (A.F.L.) or the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America, Local 886 (A.F.L.). The election will be held at the direction of NLRB.

Decree Modified Against Jersey Company

WASHINGTON.—The Department of Justice this week announced that with its approval, the federal court in Newark had modified the antitrust consent decree against Standard Oil Co. (New Jersey) to provide a new basis for licensing hydrogenation patents heretofore pooled by the 18 oil company stockholders in Hydro Patents Co.

The consent decree of March 25, 1942, required dissolution of Hydro Patents and the other stockholders have agreed to the new plan under which Standard Oil Development Co. and Standard Catalytic Co. will issue licenses. The plan will make available to the industry several alternative types of licenses under the hydrogenation patents, and additional rights and technical information relating to the hydrogenation process of all 18 members. The plan will result in savings to the government in purchases of aviation gasoline due to royalty-free use of the hydrogenation patents during the war.

Competition Best Market Aid, Says Majewski

MITCHELL, S. D. — Competition offers the quickest and fairest way of establishing postwar markets, declared B. L. Majewski, chairman of the distribution and marketing committee of Petroleum Industry War Council, speaking last week before the annual meeting of South Dakota Independent Oil Men's Association. Early restoration of competition in the oil industry would be a major factor in effective and sound postwar planning, he said.

"Beware, well-intentioned oil people, of government invitation to save you," Majewski warned. "Stop asking for a continuation of government controls for a brief period after V-Day. Stop asking for floors on prices as well as ceilings to consumers. You will get more than you bargained for. But it will all be bad."

Pointing to the impressive accomplishment of organization in the case of the C.I.O. Political Action Committee, Majewski said business, particularly small business, should have the same right as labor to bargain collectively for betterment, and should be subjected to the same regulations.

The speaker said the East Coast faces an oil transportation situation nearly as critical as in the winter of 1942-43. He said the military has made heavy demands on all transportation facilities, including tanker capacity from the Gulf Coast to the East, because of stepped-up war operations, and indications are that there will not be enough tankers to meet civilian demand.

Railroads, said Majewski, have been asked to add another 200,000 bbl. daily to eastern tanker movement by December 1 and there was doubt this could be done, with so many tank cars in service to the West Coast. He emphasized the East Coast crisis would affect supply and transportation arrangements in every other section. He asserted there is no chance of liberalizing gasoline or fuel oil rations until after defeat of Germany.

Columbia Ordered to Sell 196 Million of Assets

PHILADELPHIA.—Columbia Gas & Electric Corp. was ordered by the Securities and Exchange Commission in Philadelphia to dispose of $196,000,000 of its $600,000,000 assets.

This, the commission said, would include six operating companies in the Dayton-Cincinnati group and incidental investments in 11 other companies to comply with geographic provisions of the holding company act.

Columbia is a major intermediate holding company in the United Corp.

The companies in the Dayton-Cincinnati group of which Columbia has been ordered to divest itself are: The Cincinnati Gas & Electric Co., the Dayton Power & Light Co., the Miami (Ohio) Development Co., Miami Power Corp., the Union Light, Heat & Power Co., Covington, Ky., and West Harrison (Ind.) Electric & Water Co., Inc.

The $11,000,000 in incidental interests to be disposed of under the order include Columbia's holdings in American Water Works & Electric Co., Argo Oil Corp., Bridge Gas Co., Columbia Corp., Servel, Inc.; the Ohio Fuel Supply Co., Columbia; Wood Coal Co., Wooster (Ohio) Tool & Supply Co. and United Corp.

Jurisdiction was retained over 10 companies; Big Marsh Oil Co., Amere (W. Va.) Gas Utilities Co., Atlantic Seaboard Corp.; Binghamton (N. Y.) Gas Works, Eastern Pipe Line Co., Home Gas Co., New York; the Keystone Co., New York; Virginia Gas Distribution Co., Virginia Gas Transmission Corp., and Viking Distributing Co.

A. S. M. E. Will Hold Joint Meeting December 19

The Mid-Continent section of the American Society of Mechanical Engineers will hold a joint meeting with the Oklahoma City branch next week. The meeting will be held at the Sherman Machine & Iron Works, 18-26 East Main Street, Oklahoma City, December 19. W. S. Sherman, vice chairman for the Oklahoma City area, has arranged for dinner at 6 p.m. The evening's program will feature a talk by Nathan Janco, Centrifugal Casting Machine Co., Tulsa, on "Centrifugal Castings."

Mexico's Exploration Program Intensified

MEXICO CITY. — Ricardo Iturbe, head of the technical department for petroleum exploration, Petroleos Mexicanos, reported last week that work is to be intensified throughout northern Mexico from Sonora to the Gulf of Mexico.

DEATHS

Amos A. Park, 79, retired oil producer, died November 25 in Bradford, Pa. For 26 years he was employed as a telegrapher and station engineer in the Bradford area for Tide Water Pipe Co., Ltd. Later he became an oil operator on his own account.

A. H. Furse, 45, of Eastland, Tex., president of Duquesne Oil Corp. and secretary of West Central Texas Oil and Gas Association, died November 28 of a heart attack while on a business trip to Midland, Tex. He had been associated with States Oil Corp., of which Duquesne is a subsidiary, for 18 years.

W. B. Fry, 69, petroleum geologist, died recently in Kamsack, Sask. Of American birth, he went to Turner Valley in 1929 and in recent years has been associated with Saskatchewan oil development. His book, "Geology for the Layman," will be published posthumously.

George M. Vandaveer, 69, for 14 years superintendent of pipe lines for Stanolind Oil & Gas Co. in Casper, Wyo., until his retirement in 1934, died November 15 in Neodesha, Kans. Before going to Casper Vandaveer was a superintendent for Prairie Pipe Line Co. in the Mid-Continent area. He was employed by the old Midwest Refining Co. before it was taken over by Stanolind.

E. M. Welsh, 60, oil traffic manager since 1918 of The Buckeye Pipe Line Co., New York Transit Co., Inc., and Northern Pipe Line Co., died at his home in Garden City, L. I., November 19. Welsh had been with Buckeye and affiliated companies 43 years.

Albert W. Howe, 60, member of the engineering department of Empire Oil Co., died December 2 in New York.

31 G-MV Compressors

(PRODUCING 31,000 HORSEPOWER)

on the Tennessee Gas Line

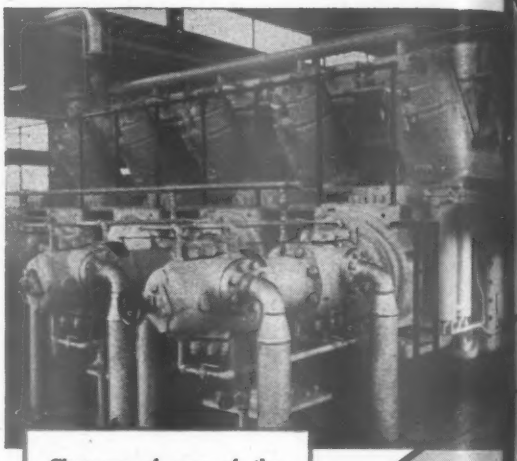
The G-MV's are in operation — pumping gas on the new Tennessee Line from Corpus Christi to Cornwall — 31 big 10-cylinder V-angle engines, each developing a conservative 1,000 horsepower.

These Cooper-Bessemers, representing well over half the compressor horsepower on the Tennessee Gas & Transmission Company project, are located on the northern portion of the line — at the Batesville, Miss., Lobelville, Tenn., Campbellsville, Ky., and Ashland, Ky., stations.

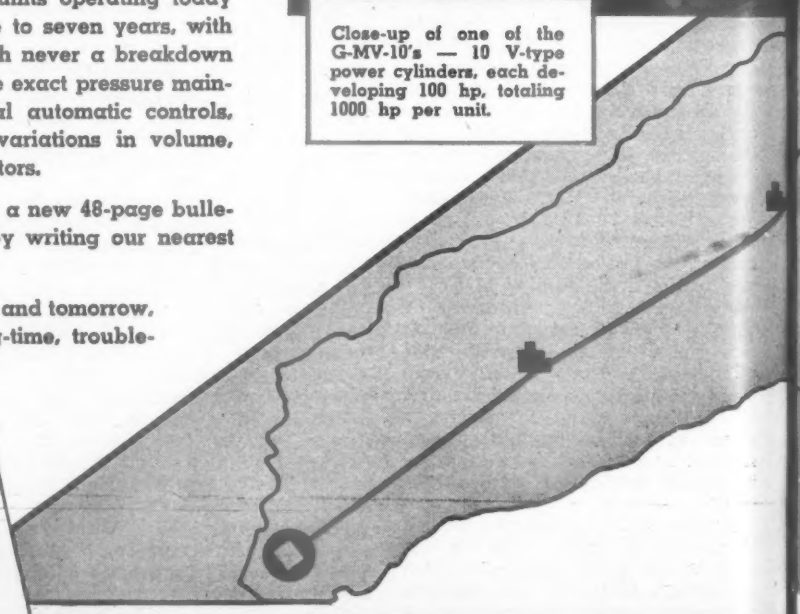
In selecting the G-MV, T. G. & T. officials picked the most efficient compressor to be had — one that has stood the test of continuous, tough performance — not only in gas transmission, but in all other phases and types of compressor service as well. Scores of units operating today have been running steadily for five to seven years, with minimum upkeep and attention, with never a breakdown or major repair. On jobs that require exact pressure maintenance, the G-MV, with its special automatic controls, delivers the goods regardless of variations in volume, temperature, or other fluctuating factors.

The full story of the G-MV is told in a new 48-page bulletin, just off press. Get your copy by writing our nearest branch or the home office.

For your compressor needs of today and tomorrow, install G-MVs and be sure of long-time, trouble-free performance.



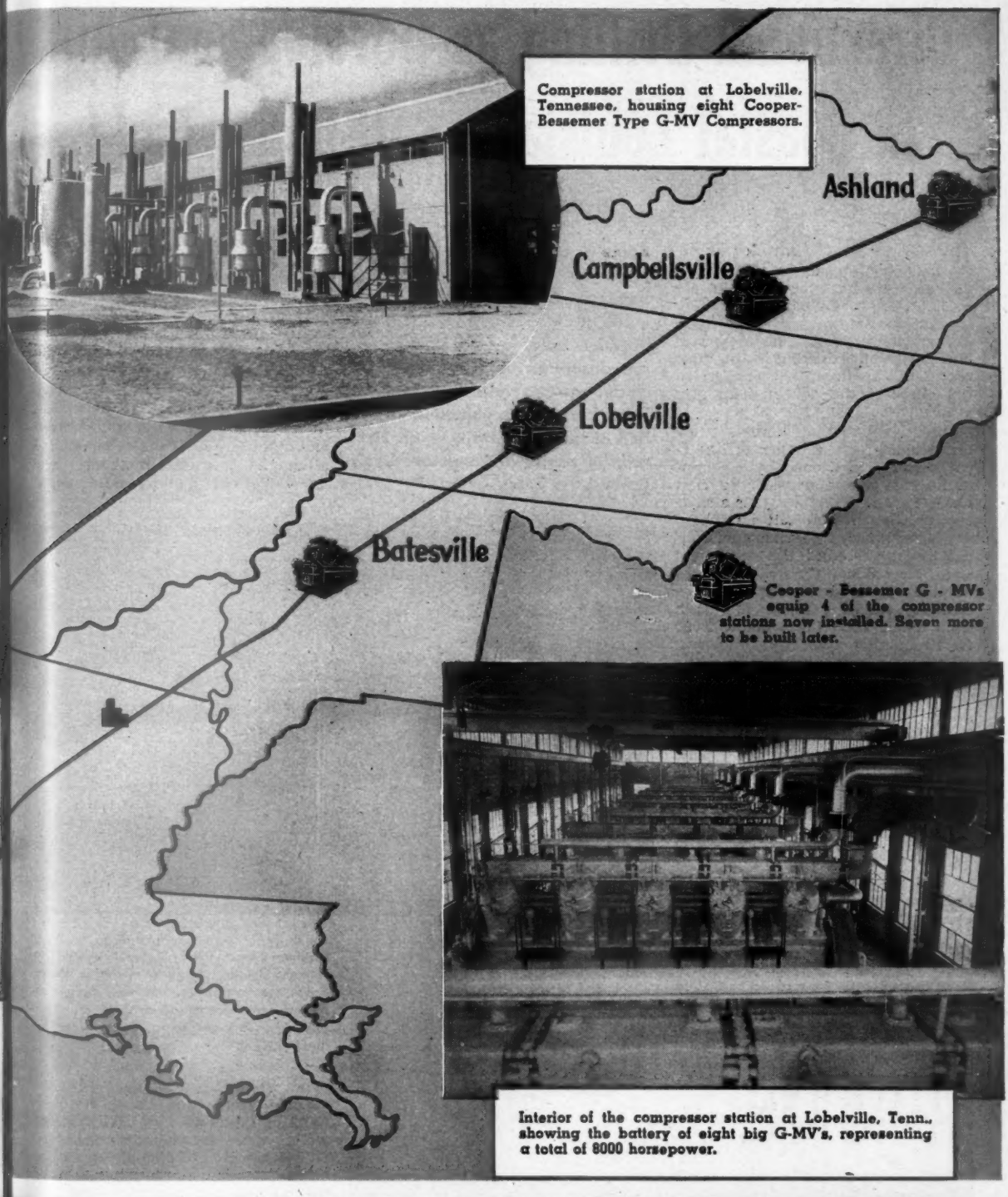
Close-up of one of the G-MV-10's — 10 V-type power cylinders, each developing 100 hp, totaling 1000 hp per unit.



TYPE G-MV ANGLE Compressors

New York Washington Bradford, Pa. Parkersburg, W. Va. San Francisco, Cal. Seattle, Wash.

Compressor station at Lobelville, Tennessee, housing eight Cooper-Bessemer Type G-MV Compressors.



Cooper - Bessemer G - MVs equip 4 of the compressor stations now installed. Seven more to be built later.

Interior of the compressor station at Lobelville, Tenn., showing the battery of eight big G-MV's, representing a total of 8000 horsepower.

by Cooper-Bessemer

MOUNT VERNON, OHIO and GROVE CITY, PENNA.

Houston, Dallas, Gregston, Pampa and Odessa, Texas Tulsa Shreveport St. Louis Los Angeles

Directional Drilling as Development Aid In Coastal Louisiana Salt-Dome Field

by Neil Williams

Some of the various practical applications of directional drilling being made to facilitate development of deep sands around the Potash Dome, coastal Louisiana, are described in this article. Included are two wells deviated from bank locations to points under the bed of the Mississippi River. Hazards of cavity and salt overhang drilling are being avoided.

FUNCTIONS of controlled directional drilling as an aid to field development are exemplified in operations being carried out by Humble Oil & Refining Co. at Potash, Plaquemines Parish, coastal Louisiana. Directional drilling in this field represents an important and essential phase of the development program.

Directional drilling here is being undertaken for a number of different reasons, occasioned by a combination of conditions. In the first place, Potash, structurally, is a shallow, piercement-type salt dome having a pronounced overhang extending at least around the south and southwest sides. Current development is in a succession of deep, flanking sands, ranging in depth from about 7,000 ft. to below 9,000 ft. Production typically follows a relatively narrow strip around the dome with the highest and most favorable positions in the respective sands lying close to the salt and under the overhang.

Vertical wells would require drilling through cap rock and salt or through mineralized sand to reach the most favorable productive positions in these sands. The mineralized sand is very porous and contains numerous cavities, which present many difficulties and hazards in drilling due to loss of returns. Attempts to plug and seal cavities have proved costly and uncertain. Drilling through the thick salt portion of the overhang also is treacherous and not desirable if it can be avoided although modern methods and knowledge of drilling mud treatment make this possible.

Drilling barge used in development at Potash. Location is at 45 Orleans Levee Board (see map), an old well being reworked by directional drilling to place bottom of hole at more favorable structural position

Group of wells at Potash drilled from same prepared location. Included are: 37 Orleans Levee Board (left), discovery well, vertically drilled; 1 State (center), directionally drilled to a point 1,334 ft. distant under the bed of the Mississippi River, and 48 Orleans Levee Board (rear), directionally drilled river bank offset to 1 State

Early efforts to prove up the deep flanking sands with vertically drilled wells were somewhat disappointing. At locations close enough up to the dome to find production, wells drilled into the cap rock and salt usually were abandoned. In moving out to get off the edge of the dome, the wells found the sands in salt water or with small production which quickly went to water. With the establishment of the presence of the overhang and the initiation of the directional drilling program it has been possible to make the surface locations sufficiently far out from the main part of the dome to

miss the salt overhang and mineralized section, and then after drilling to a depth below the bottom of the overhang, deflect the hole in toward the dome and complete the wells in the sands at their highest structural positions where excellent production now is being developed.

Drilling Procedure

Regular procedure is to drill approximately 3,500 ft. of vertical hole, or about 1,500 ft. below surface casing, usually set and cemented around 2,000 ft. Holes then are deflected at desired angles of deviation to reach predetermined subsurface objectives. Where relatively high angles are required, whipstocks or knuckle joints may be employed, although in some cases the desired deflection may be accomplished solely by control of drilling speeds and bit weights. Normally, horizontal displacements of no more than 300 to 600 ft. are required.

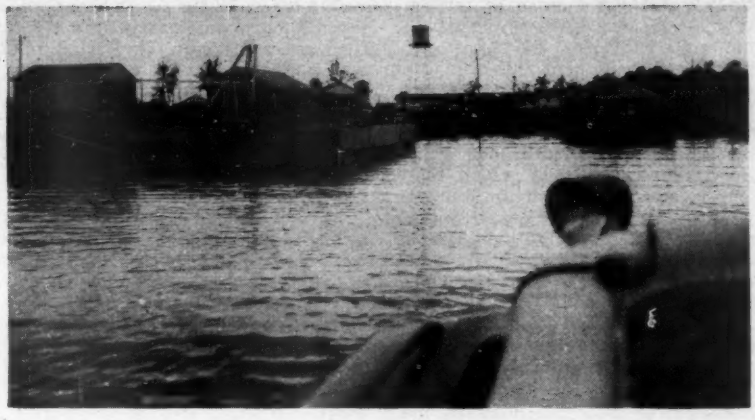
Should a test fail in its first objective, opportunity is offered to sidetrack and deflect the hole to another position in the same sand or to another sand, avoiding the necessity of drilling an entirely new well. This application also is being made to some of the older wells drilled before the directional program was undertaken, which, as they go off production because of water encroachment or other reasons, are being reworked by plugging back and sidetracking the old hole to other objectives.

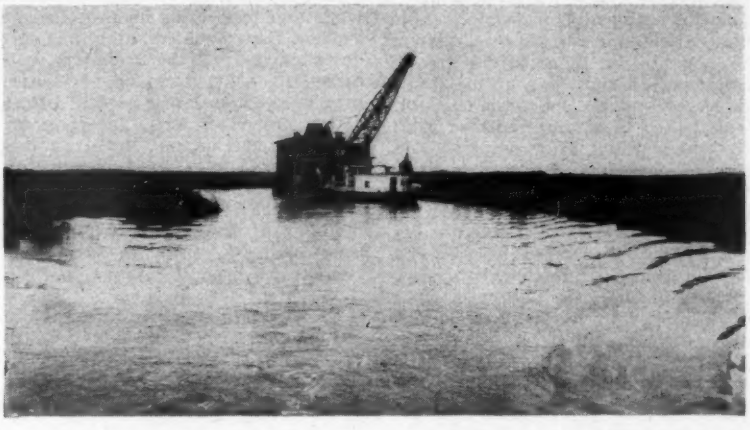
Seven of the present 21 producing wells in the field have employed directional drilling as an originally planned procedure with surface locations made specifically for that purpose. In addition, directional drilling has been employed in a well later abandoned as dry, in which three different holes were drilled to different objectives.

Of the seven producing wells started as planned directional-drilling projects, two were deviated to avoid cavities while the others were necessitated because of inaccessible surface locations.

Location of the field is on the east bank of the Mississippi River, about 55 miles below New Orleans. It is entirely within the Bohemia overflow spillway, a stretch of waste marsh land, through which excess water to the river is diverted during flood seasons. The productive area extends out below the bed of the river where development has been extended, and two wells completed to date. Access to locations within the field is only by means of dredged canals, through which the drilling and servicing of wells is carried on by barges and boats.

These conditions create many inaccessible and inconvenient locations, particularly those under the bed of the river. Drilling in the river not only is not permissible but also is not feasible because of the great depth and current of the river at this point, and the navigation and other hazards involved. This necessitates that all wells under the river bed extending around the southwest, west, and northwest sides of the dome, must be drilled from the bank. It also is necessary that the surface locations for these wells be a considerable distance back from the bank in order to minimize the possibility of the river bank being washed out and the river breaking through the fields.





Top: Boat landings and portion of camp site and operating headquarters for servicing of Potash field. Site is from 3 to 4 miles by canal from field operations in marsh. Bottom: Dredging canal extension and slip to new well location at Potash

First Oil Wells Drilled in 1942

The two wells drilled under the river are Nos. 1 and 2 State, located respectively on the southwest and northwest flanks of the dome. The first, drilled in 1942, has a horizontal displacement of about 1,350 ft. at a total depth of 8,600 ft. First "kickoff" was made with a knuckle-joint setting at 2,316 ft. to which depth the hole was drilled vertically with 10-in. surface casing being set at approximately 2,000 ft. Maximum angle built up in the deflection was displacement of about 1,350 ft. at a depth of 8,600 ft. First "kickoff" was made with a knuckle-joint setting at 2,316 ft. to which depth the hole was drilled vertically with 10-in. surface casing being set at approximately 2,000 ft. Maximum angle built up in the deflection was 17°. Both knuckle joints and whipstocks were used at different times.

Surface location is only approximately 150 ft. from the surface location of No. 48 Orleans Levee Board, its river-bank offset, which was directionally drilled to a point within 400 ft. of the river bank, another inaccessible surface location. Both wells adjoin the location of No. 37 Orleans Levee Board, discovery well, which was vertically drilled. The three wells were drilled from the same canal slip, which is the closest point to which the canal could be dredged to the river and the desired locations.

The second river well, No. 2 State, on the northwest flank, was drilled from a surface location approximately 800 ft. back from the river bank to an objective approximately 1,700 ft. south 11° W. at a depth of 9,500 ft. This well also attained maximum angles of from 16° to 17°. Deflection was started at 2,151 ft. with 10¾-in.

surface casing cemented at 1,960 ft. Whipstocks were used exclusively for angle controls.

Surface location of this well also adjoins that of its river bank offset, No. 63 Orleans Levee Board, which was directionally drilled to a subsurface location within 500 ft. of the river. The slip in which these wells were drilled is at the extreme western end of the canal to the northwest flank operations and is the closest point to which the canal could be dredged to the river bank. A third test, No. 64 Orleans Levee Board, was drilled from the same canal slip, all locations being within a radius of approximately 100 ft.

The latter test involved the drilling of three deflected holes in one, reaching as many different subsurface objectives. The original hole was deflected in toward the dome on the possibility there might be an overhang on that side of the dome as was found on the south flank. It was drilled to a total depth of 9,023 ft. with bottom at a point 431 ft. south 78° east of the surface location. Finding salt, this hole was plugged back to 7,375 ft., where it was sidetracked and deflected in approximately the same direction but a little straighter down with a view toward placing the bottom a little farther out from the dome. This hole also drilled into salt, and was plugged back into the original hole to a point just under the surface casing around 3,495 ft. At that depth the old hole was sidetracked again for a third attempt. The latter hole was deflected almost due north of the surface location in an another effort to get still farther out from the dome. Reaching a total depth of 10,095 ft., with no show, mechanical trouble was encountered which resulted in abandoning the well.

Wells in this field are drilled with a drilling barge. When multiple wells are drilled in the same slip or at the same prepared location site, the locations need be spaced just far enough apart to permit the drilling barge and servicing barges and boats to clear previously completed wells. Usually 100 ft. is adequate.

Altogether, more than 30 deep wells and tests have been drilled at Potash. Directional drilling was undertaken in 1941, the first such well being No. 48 Orleans Levee Board, previously mentioned as the offset of the first river well. The program has been carried out with a minimum of difficulty and expense.

Frederick H. Kate, formerly a member of the geological staff of Shell Oil Co., Inc., in Tulsa, has been transferred to Oklahoma City.

Dr. Ellis H. Scobie, formerly of Indianapolis, is Bay Petroleum Corp.'s new district geologist in Midland, Tex.

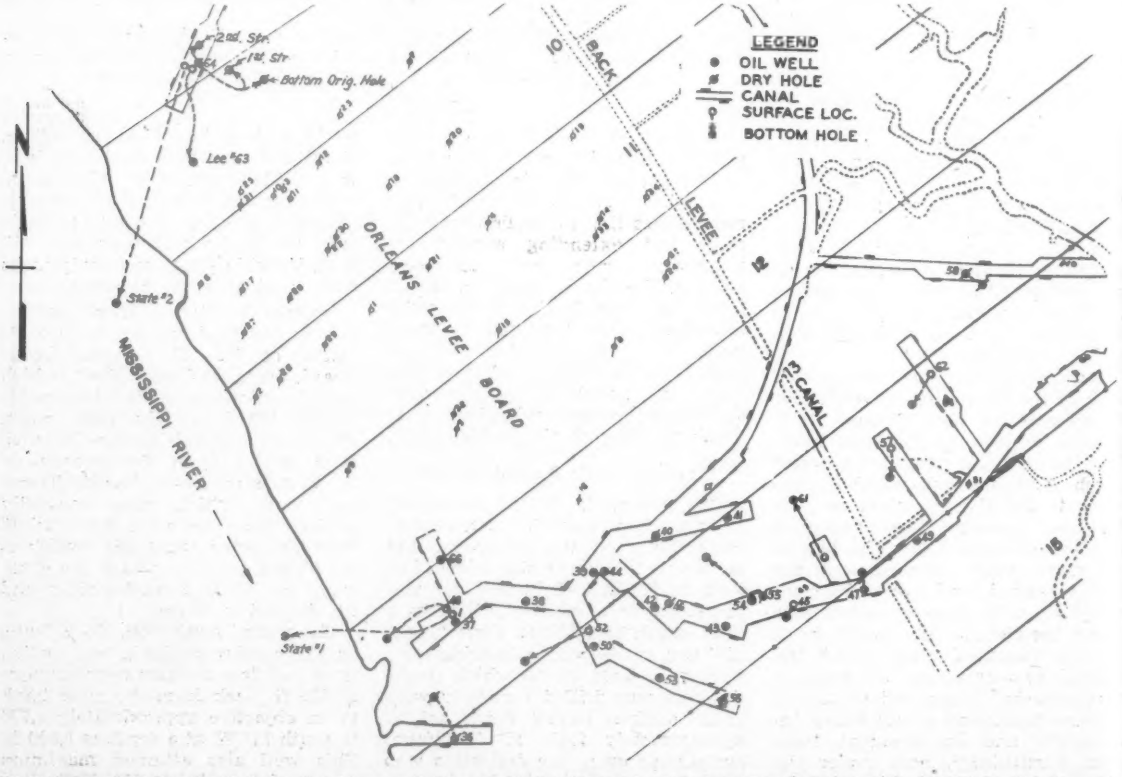
BOOK REVIEW

THE TECHNIQUE OF TERRAIN. By H. A. Musham. Reinhold Publishing Corp., 330 W. 42nd St., New York. 228 pp. $3.85.

This book, according to the preface, is intended as a text on maps and their uses in field operations in war and peace. It is not concerned with the making and production of maps nor is it intended as a complete treatise on topography. As far as practicable, the mathematics of the subjects has been eliminated. As the text is intended to further serve as a reference manual, many tables of pertinent data have been added. It clearly and simply explains how to record terrain correctly, the use of relief, indications of distance and direction, coordinates, conventional signs, the relation of maps to logistics and to aerial photography. The text is profusely illustrated and the explanations are accompanied by selected problems.

D. W. Spencer, assistant division production superintendent in West Texas and New Mexico for Sinclair Prairie Oil Co. and affiliates since 1940, has resigned to go into business as a drilling contractor.

J. B. Fisher, Bradford; **H. A. Logan,** Warren, and **Samuel Messer, C. L. Suhr,** Oil City, comprise a special committee named by **D. T. Andrus,** president of Pennsylvania Grade Crude Oil Association, to make a study of postwar marketing problems confronting the Pennsylvania oil industry.



Map of Potash field, showing canal system and deep sand development, with intentional directionally drilled wells. In center area, at top of dome, are numerous shallow tests drilled in early development of the field

Operating Results Explain Expansion Of Multipay Completions in Texas

by Kenneth B. Barnes

In some Texas areas, greater well depths, coupled with thin individual pays, have increased multizone completion practice, particularly of the dual type. Typical arrangements are presented here, and use of crossover packers, side-door chokes, and other devices are described.

MULTIPAY completions in Texas as a production practice have grown rapidly. Since 1940 the number has practically doubled each successive year, with 255 formal orders having been granted in the first 10 months of this year. Expansion of the work by years, bracketed for each of the most active districts, is illustrated in Fig. 1.

Areas which have the most multiple completions, in order, are: Districts 4, 3, 6, and 2. However, in 7-B a total of 44 permits has been issued, including 15 this year. District 8 has had a total of 10; District 1 has had 9; with 1 each in Districts 5, 7-C, and 9. Only District 10 is not represented so far.

In Table 1 are given, by districts, the number of permits for the pools which have had the major number of multipay completions. Outstanding in recent activity as to number of jobs are: East Placedo, Stowell, Seeligson, New Hope, Wimberly, with Aqua Dulce and Stratton continuing their former high level. Of course, unless a pool is quite large or development is prolonged, usually if multipay completions are effected in a field most of them will be made during a span of 1 to 3 years.

There have been a few triple-zone completions. The first project of this kind in Texas was described in the October 21, 1943, issue of The Oil and Gas Journal, by E. H. Short, Jr., the well being Superior Oil Co. 5 McWhorter, located in the Lake Creek pool of Montgomery County. Otherwise all have been dual-production completions in the four classifications: (1) Dual oil; (2) dual gas; (3) upper oil, lower gas; (4) upper gas, lower oil; and some combina-

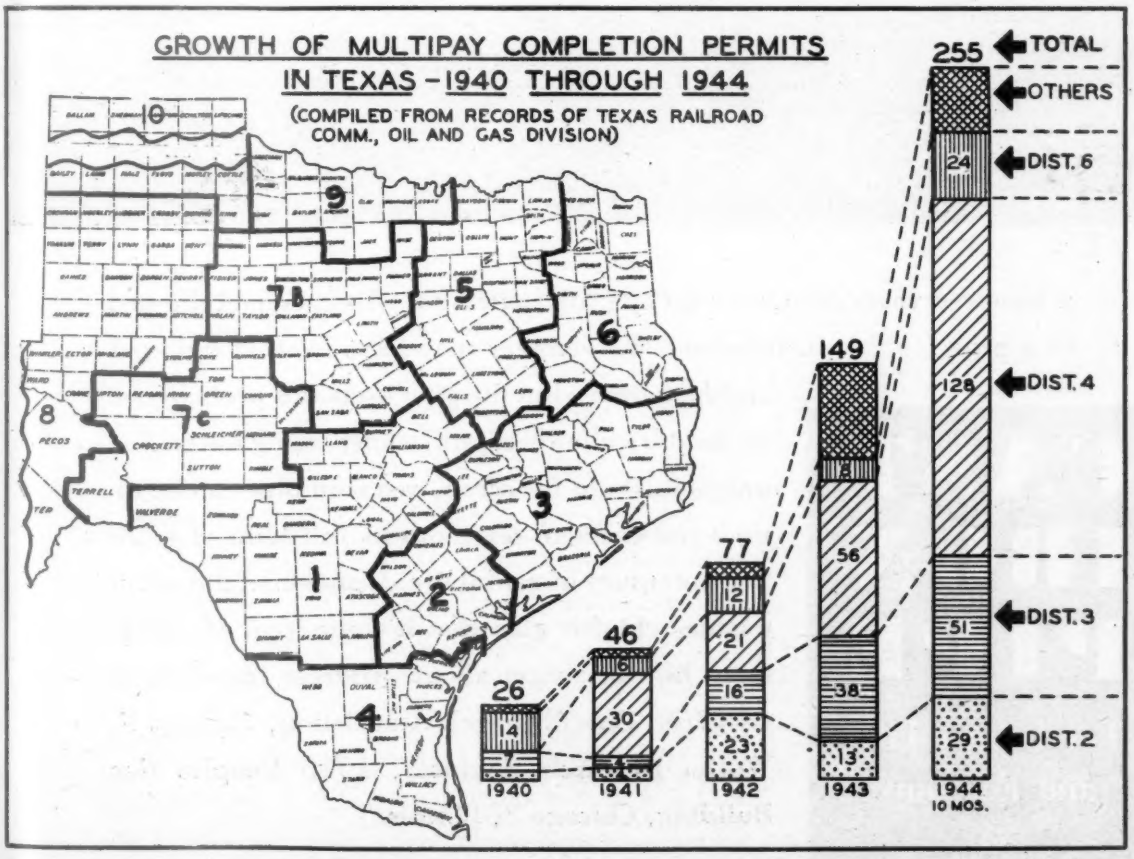


Fig. 1—Number of formal permits for multipay completions granted by Texas Railroad Commission by years

Cast iron pipe used for water station in Texas Refinery

A hundred years from now no one will remember who specified the cast iron pipe for this installation—the refinery may have been abandoned and forgotten—but the pipe itself will probably be on the job somewhere, still transporting water. For unless it is sold for scrap, cast iron pipe can be re-used elsewhere to serve out its full term of more than a century of useful life. Meanwhile, the maintenance chief is glad that it's one item of equipment he can forget about. Address inquiries to Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago 3, Illinois.

CAST IRON PIPE

For Longer Life and Economy

tions of injection to one pay with production from another. A substantial part of the dual jobs has been in connection with cycling operations.

Basically the purpose of a dual or multipay completion is to make one well bore do the work of two or perhaps three, and the appropriateness of decisions to use or not use the practice rests principally in an economic balance of a number of factors. This balance will be between the actual savings that may be obtained from the multiple completion and the sum of whatever practical difficulties there will be in (1) effecting and maintaining a positive seal between the formations; (2) keeping free of obstructions the exposures to the formations and up

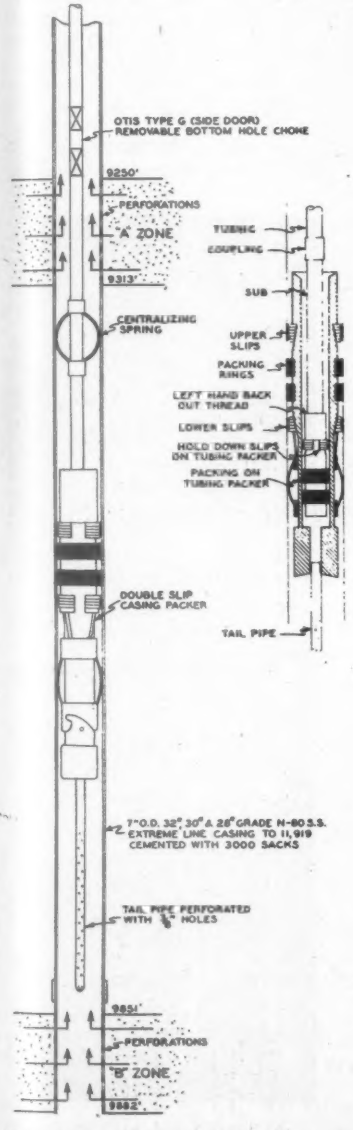


Fig. 2—Recently completed dual completion in Texas; side-door choke permits obtaining reservoir pressure of each zone

TABLE 1—TEXAS POOLS MOST ACTIVE IN MULTIPAY COMPLETIONS

Field—	1940	1941	1942	1943	10 mos. 1944
District 1:					
Washburn	..	..	3	4	..
District 2:					
West Ranch	1	1	1	6	5
Francitas	..	..	7	..	..
La Rosa	..	1	8	2	..
East Placedo	..	..	..	..	11
District 3:					
Satsuma	6	..	..	..	..
Lake Creek	..	..	9	..	..
League City	..	..	..	6	1
Old Ocean	..	..	..	6	8
Stowell	..	..	..	19	16
District 4:					
Agua Dulce	..	11	2	16	11
Stratton	..	3	9	7	18
La Gloria	..	10	1	1	..
Seeligson	..	..	1	20	73
E. White Point	..	..	..	1	7
District 6:					
Long Lake	12	3	..	1	..
Chapel Hill	..	1	8	..	..
Carthage	..	..	4	4	7
Cayuga	2	2	..	2	2
New Hope	..	..	..	1	15
District 7-B:					
Wimberly	..	..	..	25	12
District 8:					
Sand Hills	..	..	..	..	2

the flow passages to the surface; and finally, (3) producing each of the formations to ultimate exhaustion.

The relative "unbalance" becomes more favorable to the multiple-zone work as depths increase and cost of the single well goes up. Further, the favor increases as the yield per acre from the zones becomes less, and in cases, formations can be produced simultaneously which could not profitably be drilled separately or even produced one after the other. These factors can be briefly illustrated by the following simple arithmetic examples, with the revenue from crude taken as $1.00 per barrel, after deducting royalty and severance or gross production tax:

Governing Economic Factors

A $25,000 well which on 40-acre spacing will recover 6,000 bbl. per acre requires only 10.4 per cent of the total revenue to repay its cost; at 4,000 bbl. per acre, 15.6 per cent; at 2,000 bbl. it becomes 31 per cent.

The proportions are doubled for a $50,000 well, and 21 per cent; 31 per cent, and 62.5 per cent, respectively, of the total yield are necessary to pay out the well.

For a $100,000 well the ratio of well cost to gross revenue doubles again, and is 42 per cent, 62.5 per cent, and 125 per cent for the same scale of recoveries.

It is thus obvious that in shallow, low-well-cost areas, the savings and incentive for multiple production are much less, and also that well cost becomes less of a factor as recoveries increase into the higher ranges. The dual work in Texas is in large part brought about by the depth factor, and the majority of permits granted have been for wells in the range of 5,000-10,000 ft. The average well drilled in the Texas areas which have the most multiple completions is by no means particularly shallow, as may be seen in Table 2 which gives the depth figures for this year.

The economic balance between single and dual completions usually cannot be computed in figures that will coincide as precisely with following experience as do estimates for the more common items of well expense. However, most of the considerations involved, which include the investment cost for drilling, equipping and producing a number of single-zone wells, the operation cost of producing one of the zones after another together with the deferment factors, and the cost to drill and execute the dual completions, can be estimated with considerable certainty. The most difficult part lies in determining the probable cost of maintaining a satisfactory multiple seal, keeping the different ex-

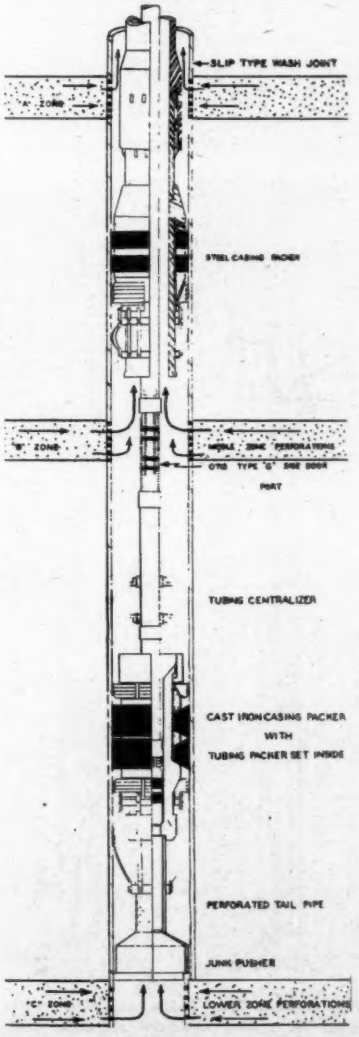


Fig. 3—A triple-zone arrangement used in a 10,000-ft. well in Texas this year; each pay is produced separately

TABLE 2—NUMBER OF WELLS DRILLED AND AVERAGE DEPTH IN TEXAS AREAS OF PRINCIPAL MULTIPAY COMPLETION ACTIVITY

	Eastern Texas		Upper Gulf Coast		Lower Gulf Coast		South Texas	
Period—	No.	Av. depth	No.	Av. depth	No.	Av. depth	No.	Av. depth
January 1944	25	6,210	34	6,840	47	6,480	29	4,000
February	7	7,190	45	6,850	51	6,420	24	6,380
March	33	5,920	40	6,960	59	5,840	39	5,090
April	16	5,500	61	7,000	41	6,160	29	3,940
May	36	6,090	55	7,210	64	6,440	54	4,120
June	26	5,090	88	7,510	78	6,760	54	4,085
July	34	5,985	54	7,610	61	6,410	29	4,555
August	15	6,665	69	6,770	72	6,560	57	4,120
September	31	6,380	74	6,845	58	7,110	34	3,470
October	24	6,690	64	6,640	47	6,455	7	5,140
Total comp., 10 mos.	247		584		578		356	
Ttl. footage, 10 mos.		1,502,605		4,113,124		3,748,661		1,546,240
Av. depth, wtd.		6,065		7,040		6,480		4,345

posures and flow passages open, and for production costs in the artificial-lift stage.

Techniques of Multiple Completions

Almost all of the multiple completions in Texas have been for flowing conditions. Texas regulations specifically require that concurrent production of fluids from separate strata be done without commingling, and accordingly the mechanics are not the simple practice of simply cutting windows or perforating at the productive zones and running tubing. In submitting application for hearing on formal order for a dual-completion installation, the following data are to be supplied to the engineering department of the Railroad Commission:

1. Full-scale electrical log of the well with items (a), (b), (c), and (d) below written thereon.

(a) Names of the two horizons involved in the dual completion.

(b) Upper limit and lower limit of each of the two horizons in which dual completion was made.

(c) Perforated interval in each horizon.

(d) Depth at which packer was set to separate the two horizons involved and the type of packer that was used.

2. Diagrammatic sketch of the mechanical installation which will be employed to produce the well from both zones.

3. Statement as to what kind of completion was effected; that is dual oil, dual gas, or dual oil gas. If completion is dual oil gas indicate from which horizon each product is produced.

4. State which horizon is to be produced through the tubing and which through the annular space.

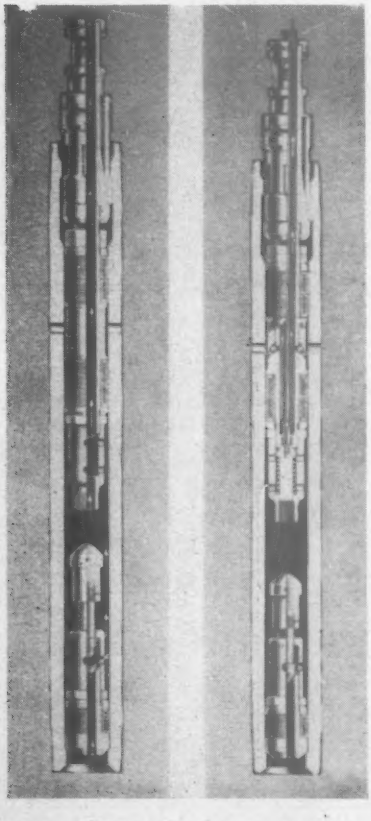


Fig. 4—Side-door choke assembly when used for taking separate reservoir pressures. (Left) Communication to lower zone. (Right) Packing mandrel in position and ports open to upper zone

Pays Produced Separately

A thorough knowledge of the different packers, subs, safety joints, valves, spacers, retainers, setting tools, bottom hole chokes and regulators, tubing heads, seals, etc., that are available is needed to design and construct the variety of multiple completions that may be made for different situations. Texas requires that for oil zones the completions shall be such that bottom-hole pressures can be taken of each. The use of side-door chokes is one manner of accomplishing this, and the use of sonic measurements for obtaining static liquid levels in the annular flow space also is permitted.

Not only are the design of the completion and the selection of the equipment items making up the installation important factors in obtaining a successful initial seal between the zones and permitting later adjustments and remedial work without undue expense, but the equipment must be run and set properly and subjected to adequate pressure tests. Faulty running and setting can damage packing elements and twist, freeze, or elongate parts which may lead to fishing jobs. Care and precautions must be taken from the first, in selecting the depth intervals of the zones to be opened through to the final testing of the completion. Possibly this need may be emphasized by picturing a 10,000-ft. well in the horizontal plane, with the elevators handling the tubing at one end and the dual-zone equipment assembly at the other end working into a definite position at a point 2 miles away within a tolerance of less than 1 ft.

This article cannot describe all of the different combinations and arrangements of multiple-zone production assemblies nor entail in detail the many installational practices, but a few typical and also unusual types will be given as examples. Fig. 2 is a diagram of a recently finished deep dual-zone well in the Texas Gulf Coast. A double-slip hook-wall casing packer is employed between zones A and B. Pres-

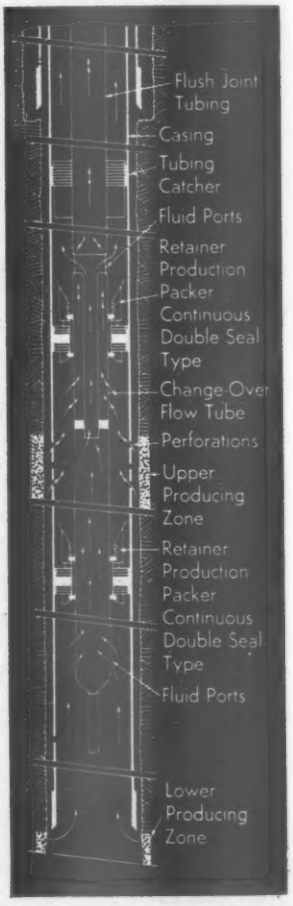


Fig. 5—One type of crossover used: lower zone flows through annulus and upper zone produces through tubing

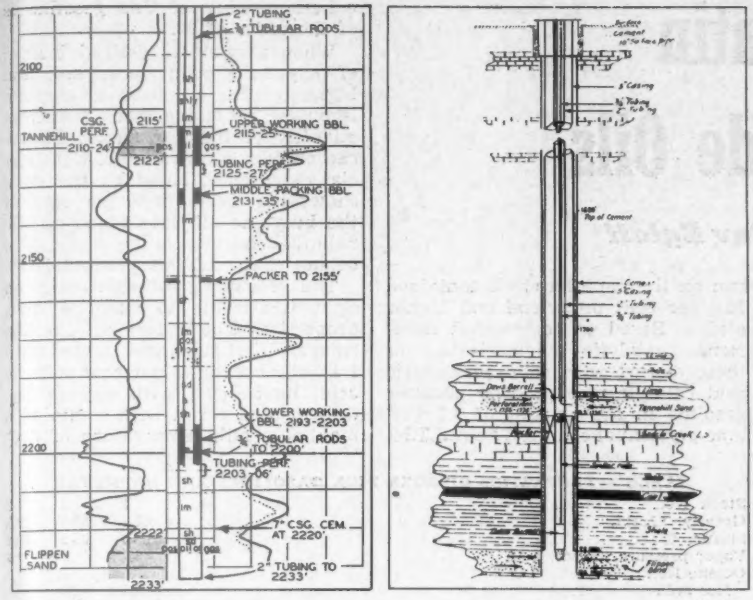


Fig. 6—Mechanical arrangement using special barrel for simultaneous but separate pumping from two formations. (Left) Electric log and schematic layout for well in Wimberly pool, Jones County, Texas. (Right) Diagrammatic sketch for similar well in Sayles pool of Jones County

sure tests on zone A can be made through the tubing by use of the side-door choke.

A drawing of a triple-zone well completed this year in Texas at 10,000 ft. is given in Fig. 3. Much care in making up the assembly and attention to depth measurements were employed, and the job tested successfully and was placed on production after the packers were positioned and set.

As has been mentioned, a side-door choke may be used in obtaining pressures from a zone ordinarily flowing upward through the annular space where a bottom-hole pressure gage cannot be run. In Fig. 4 (left) upward flow through the tubing is pictured across the choke section. A gage can be run to the choke for obtaining the static pressure of the communicating productive zone. To obtain the pressure in the upper zone a packing mandrel is run which is closed at the bottom but has horizontal perforations between the upper and lower packing elements. By this means the tubing becomes a conductor for the upper productive zone only.

In dual-pay wells often the lower formation has the greater pressure and will flow more readily than the upper formation. In instances where the upper pay must be handled through the tubing to facilitate flow a crossover packer arrangement can be used. A description of one project of this type for the Tubb and Ellenburger pays of the Embar field, Andrews County, was given by Joseph G. Gordon in The Oil and Gas Journal for June 17, 1944.

Crossover packers have been in frequent use in Texas this year. Survey of formal orders granted this year shows the following activity:

	No. crossover installations
District 1:	
East Placedo	2
West Ranch	5
Others	1
District 3:	
Old Ocean	2
Joyce Richardson	1
District 4:	
Seeligson	26
East White Point	3
Aqua Dulce	1

One arrangement of this class is illustrated in Fig. 5, and a number of types of packers and equipment for "crossovers" are available from different manufacturers.

As previously stated almost all of the dual completions in Texas have been for flowing conditions. Where pumping must be used, an interesting development has been employed this year in a number of shallow wells in the Wimberly field of Jones County, and one in the nearby Sayles pool. Here two productive formations simultaneously are pumped separately, the lower through ¾-in. tubing which is used for a sucker-rod string. A diagrammatic outline of two such installations is shown in Fig. 6. There is a middle packing barrel set in the annulus at an intermediate point between the pays with the lower barrel of conventional type. The upper working barrel is metal-to-metal type. Production from the ¾-in. tubing at the surface is taken through a flexible hose connection.

Report on Air-Gas Injection And Well Conditioning

THE U. S. Bureau of Mines, through Dr. R. R. Sayer, director, announced release of "Wartime Application of Air-Gas Injection and Oil-Well Reconditioning in the Appalachian Region" by Sam S. Taylor. Taylor is a petroleum engineer, attached to the bureau's petroleum field office at Franklin, Pa.

The introduction to the subject states:

"This report deals with a comparatively simple application of some of the engineering principles involved in the evaluation, installation, and operation of air or gas-injection projects and well cleanout and repair methods to increase the producing rates of oil wells in partly depleted pools during the war. The methods suggested for developing gas-injection projects take into consideration that, in general, no new wells will be drilled because of wartime restrictions of equipment and manpower and that only existing wells and second-hand machinery will be used. Because air will be employed as the injection medium in secondary-recovery operations where natural gas is scarce and expensive, the disadvantages and hazards accompanying its use are discussed. Engineering techniques recognized as best modern practice are discussed in relation to the effect of simple air-injection development of properties on postwar operations and probable ultimate recovery of oil. The report is an introduction to where, when, why, and how an air-injection project should be installed and operated.

"The report is intended mainly for those thousands of operators in the Appalachian region owning a few wells producing small quantities of oil daily. Many such operators are anxious to increase their production rates by stimulative means and to rehabilitate their wells so that they will produce more oil to help win the war but, in general, are unfamiliar with secondary-recovery operations and cannot afford to hire technical assistance.

"Although this report discusses secondary-recovery methods and reservoir conditions found in the Appalachian region and the section on oil-well cleanout and repair methods is based upon practices in that area, much of the report is applicable to oil properties in other sections of the United States if proper allowances are made for their differing economic, reservoir, and operational conditions."

Copies of the issue (Report of Investigations 3777) may be obtained without charge from the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Cracking of Latin American Crude Oils

*by Dr. Gustav Egloff**

6.—REFORMING MEXICAN GASOLINES AND NAPHTHAS

THE Poza Rica field was discovered in 1930 and its increasing production rate has been responsible chiefly for offsetting partially the decline of the older Mexican producing areas. Poza Rica crude oils are both paraffinic and asphaltic in character and vary in A.P.I. gravity from 28° to about 34°. To examine thermal reforming of gasoline and naphthas from a typical Poza Rica crude oil, test runs were conducted on stocks varying from 68° to 54° A.P.I. in gravity. The crude oil from which the gasolines and naphthas were produced had the properties shown in Table 1.

The straight-run stocks were reformed thermally in a pilot plant under once-through conditions. The properties of the three stocks which were reformed are shown in Table 2. The A.S.T.M. octane numbers varied from 51 in the lightest charge to 29 in the heaviest.

The lightest gasoline was reformed under one set of operating conditions, the next heaviest, under two sets of conditions involving a considerable temperature differential. The naphtha as the heaviest of the charging oils was also reformed under two sets of operating variables involving both a change in temperature and in charging rate. The conditions employed in the runs, and the yields of products, including gasoline, residuum, and gas are shown in Table 3; the properties of the reformed products are summarized in Table 4.

The gases produced in the second run on the naphtha stock contained 16.9 per cent propylene and higher olefins. Based on commercial experience, catalytic polymerization of these olefins with solid phosphoric acid catalyst will produce polymer gasoline in the amount of 6.3 volume per cent of charge. The A.S.T.M. octane number of this gasoline is of the order of 82.

When alkylate is desired instead of polymer gasoline, propylene and higher olefins are used to alkylate isobutane providing that a sufficient quantity of the last named hydrocarbon is made available. Commercial experience, based on the data, shows that 6.1 volume per cent of the butylene alkylate based on the naphtha charge can be made. The octane rating of this product is 93.

The reformed gasolines were given light treatments to stabilize their properties. The reformed gasoline from the first stock was treated with 1 lb. per bbl. of 93 per cent sulfuric acid, neutralized with sodium hydroxide and rerun with steam at a maximum still temperature of 350°

*Director of research, Universal Oil Products Co., Chicago, Ill.

TABLE 1—PROPERTIES OF POZA RICA CRUDE OIL

Gravity, °A.P.I.	31.0
Viscosity, Universal at 100° F., sec.	60
Sulfur, %	1.72
B.s. and w., %	0.5
Cold test, °F.	5
Characterization factor	11.9
100 ml. A.S.T.M. distillation:	
I.b.p., °F.	138
10%	270
50%	644
90%	732
E.b.p.	735
Distilled over, %	94.5
Distilled at 400° F., %	24.0
Distilled at 437° F., %	27.0
Distilled at 572° F., %	42.0
Coke by weight, %	5.7

TABLE 2—PROPERTIES OF POZA RICA GASOLINES AND NAPHTHAS

Stock No.	1	2	3
Gravity, °A.P.I.	67.7	59.9	54.5
Sulfur, %	0.06	0.15	0.08
Vapor pressure, (Reid), p.s.i.	3.7	....	1.2
Octane No.:			
Research	51	37	....
A.S.T.M.	51	37	29
100 ml. A.S.T.M. distillation:			
I.b.p., °F.	110	139	194
10%	152	186	241
50%	218	272	306
90%	282	365	376
E.b.p.	312	408	415
Distilled over, %	96.5	97.0	98.0
Bottoms, %	1.0	1.0	1.0
Loss, %	2.5	2.0	....

TABLE 3—REFORMING POZA RICA GASOLINES AND NAPHTHAS; OPERATING CONDITIONS AND YIELDS

Stock No.	1	2	2	3	3
Run No.	....	1	2	1	2
Operating conditions:					
Pressure, p.s.i.	720	750	750	750	750
Temperature, °F.	1,000	920	975	980	1,000
Relative charging rate	1.80	1.95	1.94	1.43	1.28
Yields, volume % of charging stock:					
Gasoline	51.2	84.2	63.6	87.0	75.8
Residuum	2.9	2.3	4.9	0.0	5.5
Gas and loss	45.9	13.5	31.5	13.0	18.7
Gas: cu. ft./bbl. charging stock	1,201	336	810	403	647
Propylene and higher olefins, vol. % gas	....	....	....	....	16.9
Polymer gasoline, vol. % charge	....	....	....	....	6.3
Butylene alkylate, vol. % charge	....	....	....	....	6.1

TABLE 4—REFORMING POZA RICA GASOLINES AND NAPHTHAS; PROPERTIES OF PRODUCTS

Stock No.	1	2	2	3	3
Run No.	....	1	2	1	2
Untreated gasoline:					
Gravity, °A.P.I.	59.6	61.2	58.5	58.5	58.5
Gum, mg./100 ml. (copper dish):					
Without inhibitor	42	20	18	....	....
With inhibitor No. 1 (0.025%)	35	20	11	....	....
Oxygen bomb stability, induction period, min.:					
Without inhibitor	145	90	90	....	....
With inhibitor No. 1 (0.025%)	310	280	280	....	....
Vapor pressure, (Reid), p.s.i.	10.9	9.8	9.6	13.0	11.9
Octane No.:					
Research	85	61	76	....	....
A.S.T.M.	76	60	71	67	71
100 ml. A.S.T.M. distillation:					
I.b.p., °F.	90	100	108	88	89
10%	132	166	151	157	135
50%	213	258	246	275	247
90%	347	350	375	383	349
E.b.p.	414	394	405	413	399
Residuum:					
Gravity, °A.P.I.	1.9	27.1	11.8	....	19.1
100 ml. A.S.T.M. distillation:					
I.b.p., °F.	274	336	400	....	396
10%	514	370	472	....	433
50%	648	440	585	....	512
90%	....	684	754	....	703
E.b.p.	....	704	754	....	718
Distilled over, %	82.0	94.5	90.0	....	95.5
Coke by weight, %	18.5	5.3	9.9	....	4.5
Distilled at 400° F., %	3.02	28.0	....	....	trace
Distilled at 572° F., %	26.0	80.0	46.0	....	65.5

TABLE 5—TREATMENT OF POZA RICA REFORMED GASOLINES AND NAPHTHA, AND PROPERTIES OF TREATED PRODUCTS

Stock No.	1	2	3
Run No.		2	2
Acid, lb./bbl.	1.0	1.0	*0
Solution loss, %	0.8	0.5	
Treated gasoline:			
Gravity, °A.P.I.	59.3	58.2	58.0
Vapor pressure, (Reid), p.s.i.	6.0	6.5	8.8
Color, °Saybolt	30+	30	12
Color stability	27	25	
Sulfur, %	0.04	0.05	0.03
Gum, mg./100 ml. (copper dish):			
Without inhibitor	3	2	29
With inhibitor No. 1 (0.025%)	3	1	6
Oxygen bomb stability, induction period, min.:			
Without inhibitor	80	85	90
With inhibitor No. 1 (0.025%)	900+	990+	215
Octane No.:			
Research		74	
A.S.T.M.	74		69
100 ml. A.S.T.M. distillation:			
I.b.p., °F.	108	106	98
10%	142	147	138
50%	210	232	253
90%	289	332	348
E.b.p.	341	390	391
Distilled over, %	98.0	98.5	97.0
Bottoms, %	1.0	1.0	1.0
Loss, %	1.0	0.5	2.0

*Sweetened.

F. The gasoline from the reforming of stock No. 2 was treated with 1 lb. per bbl. of sulfuric acid, rerun with steam and sweetened with sodium plumbite; the gasoline from stock No. 3 was merely sweetened with sodium plumbite. The properties of the treated reformed gasolines, along with the treating losses, are given in Table 5. The gum contents were low, their inhibitor response as measured by their increased induction periods was high, and their octane numbers were above 70.

TABLE 6—PROPERTIES OF NARANJOS GASOLINE

Gravity, °A.P.I.	59.9
Color, °Saybolt	26
Color stability	....
Gum, mg./100 ml. (copper dish)	....
Sulfur, %	0.22
Vapor pressure, (Reid) p.s.i.	....
Octane No.:	
Research	41
A.S.T.M.	41
100 ml. A.S.T.M. distillation:	
I.b.p., °F.	121
10%	184
50%	277
90%	363
E.b.p.	402
Distilled over, %	98.5
Bottoms, %	1.0
Loss, %	0.5

TABLE 7—REFORMING NARANJOS GASOLINE, OPERATING CONDITIONS AND YIELDS

Run No.	1	2
Operating conditions:		
Pressure, p.s.i.	760	770
Temperatures, °F.	961	973
Relative charging rate	2.05	1.48
Yields, vol. % of charging stock:		
Gasoline	78.4	56.4
Residuum	2.0	5.0
Gas and loss	19.6	38.6
Gas:		
Cu. ft./bbl. charging stock	525	1,032
Propylene and higher olefins, vol. % gas	12.7	15.8
Polymer gasoline, vol. % charge	3.7	8.1
Butylene alkylate, vol. % charge	4.2	11.1

TABLE 8—REFORMING NARANJOS GASOLINE: PROPERTIES OF PRODUCTS

Run No.	1	2
Untreated gasoline:		
Gravity, °A.P.I.	59.2	57.9
Color, °Saybolt	....	10
Gum, mg./100 ml. (copper dish):		
Without inhibitor	....	22
With inhibitor No. 1 (0.025%)	....	9
Sulfur, %	....	0.13
Oxygen bomb stability, induction period, min:		
Without inhibitor	....	105
With inhibitor No. 1 (0.025%)	....	315
Vapor pressure, (Reid), p.s.i.	....	11.5
Octane No.:		
Research	73	82
A.S.T.M.	68	75
100 ml. A.S.T.M. dist.:		
I.b.p., °F.	91	84
10%	140	140
50%	250	240
90%	371	370
E.b.p.	405	392
Residuum:		
Gravity, °A.P.I.	12.6	4.5
100 ml. A.S.T.M. dist.:		
I.b.p., °F.	382	390
10%	441	474
50%	557	614
90%	....	....
E.b.p.	760	710
Distilled over, %	92.0	81.0
Coke by weight, %		19.0
Distilled at 400° F., %	0.5	0.5
Distilled at 572° F., %	54.0	42.0

Reforming Naranjos Gasolines

The Naranjos district is in the southern section of the Tampico-Tuxpan region. This area produces crude oils having both paraffinic and asphaltic characteristics. The majority are low in A.P.I. gravity, varying from 14° to 23°, an average being about 21°. The crudes contain about 4 to 10 per cent gasoline. They also have a high sulfur content characterizing crudes from the Tampico fields, the sulfur content of the Narajos crudes varying from 3.5 to 4 per cent. Their paraffin wax content is about 4 per cent.

A gasoline produced in the straight-run distillation of Naranjos crude was reformed to test its potentialities for producing improved octane rating gasoline. The oil was cracked in a pilot plant using once-through operation and combinations of temperature, pressure, and charging rates adapted to produce good yields of end point gasolines having commercial octane ratings. The properties of the gasoline are given in Table 6.

The conditions employed in two reforming runs and the yields of gasoline, residuum, and gas are given in Table 7, and the properties of the untreated reformed gasolines and the residuum are given in Table 8. Reforming was conducted under two different transfer temperatures, pressures, and charging rates. Under the less severe conditions employed in run No. 1, 78.4 volume per cent of 68 A.S.T.M. octane number, 405° F. end-point gasoline was obtained. Under the more severe conditions of run No. 2, 56.4 volume per cent of 75 A.S.T.M. octane number, 392° F. end-point gasoline was recovered. The second run gave about twice the yield of gas which contained considerably higher amounts of propylene and higher olefins than the gas from the first run.

Based on the olefins present in the gas and those recoverable when stabilizing the gasoline to 10 p.s.i. vapor pressure, calculations indicate that 3.7 volume per cent of polymer gasoline based on charge can be made from the products of run No. 1, and 8.1 per cent, from the

TABLE 9—PROPERTIES OF TONACINC AND MINANAVY GASOLINES AND TONALA NAPHTHA

	Field		
	Tonacinc	Minanavy	Tonala
Gravity, °A.P.I.	64.6	58.4	53.1
Gum, mg./100 ml. (copper dish)	3	15	....
Sulfur, %	0.04	0.08	0.13
Vapor pressure, (Reid), p.s.i.	4.6	3.1	....
Octane No.:			
Research	59	55	47
A.S.T.M.	59	52	....
100 ml. A.S.T.M. distillation:			
I.b.p., °F.	110	128	258
10%	168	190	273
50%	227	278	294
90%	282	362	332
E.b.p.	316	391	390
Distilled over, %	97.0	97.0	98.0
Bottoms, %	1.0	1.0	1.5
Loss, %	2.0	2.0	0.5

TABLE 10—REFORMING TONACINC AND MINANAVY GASOLINE AND TONALA NAPHTHA: OPERATING CONDITIONS AND YIELDS

	Field		
	Tonacinc	Minanavy	Tonala
Operating conditions:			
Pressure, p.s.i.	750	750	500
Temperatures, °F.	990	990	975
Relative charging rate	1.71	1.99	1.96
Yields, volume % of charging stock:			
Gasoline	67.9	62.4	78.7
Residuum	2.3	5.7	2.4
Gas and loss	29.8	31.9	18.9
Gas: cu. ft./bbl. charging stock	794	930	588
Propylene and higher olefins, vol. % gas	11.8	....	....
Polymer gasoline, vol., % charge	5.2	....	....
Butylene alkylate, vol., % charge	8.25	....	....

products of run No. 2, indicating a decided increase in potential polymer gasoline when employing the more severe conditions of run No. 2. Utilizing the total butylenes present in the gas and the gasoline to alkylate isobutane as an alternative procedure, 4.2 volume per cent and 11.1 volume per cent of butylene alkylate is obtainable from runs No. 1 and No. 2, respectively.

Reforming Tonacinc and Minanavy Gasoline, and Tonala Naphtha

Using once-through operation, further runs were made on a light gasoline from Tonacinc crude, a medium-gravity gasoline from Minanavy crude, and a naphtha produced from a crude oil originating in the Tonala area in the Isthmus fields. The important properties of these miscellaneous stocks are presented in Table 9, in which the gasoline and naphtha are listed in order of decreasing A.P.I. gravities and octane numbers. The properties of these stocks show them to be paraffinic rather than naphthenic types.

The operating conditions employed in the reforming runs and yields of gasoline, residuum, and gas are shown in Table 10; and the properties of the reformed gasolines and the residuum from the runs are given in Table 11. In order to produce 75 A.S.T.M. octane number products from the two gasolines a temperature of 990° F. and a pressure of 750 p.s.i. were employed. The lighter Tonacinc gasoline gave a 67.9 per cent yield of 75 octane number, 390° F. end-point gasoline, while the heavier Minanavy gasoline gave a 62.4 per cent yield of 74-octane-number product These results indicate that the lighter of the two straightrun gasolines was the better reforming charge. The reformed gasoline from the Tonacinc stock also showed a lower gum content and a better inhibitor response as measured by the increase in induction period from 45 to 315 minutes.

The naphtha from Tonala crude was reformed at a temperature of 975° F. under 500 p.s.i. pressure to yield 78.7 per cent of 408° F. end point, 69 A.S.T.M. octane-number gasoline. The results indicate that this naphtha is a suitable reforming stock.

The reformed gasolines were given light sulfuric acid treatments, neutralized, and rerun with steam at a still temperature not exceeding 350° F. Table 12 shows the amount of acid used, treating and distillation losses, and the properties of the treated and rerun gasolines. All of the treated products had A.S.T.M. octane numbers above 70 and showed good inhibitor response in respect to increase in induction period when adding 0.025 per cent of U.O.P. inhibitor No. 1. The gum contents of the treated gasolines from all three stocks were low enough so that no inhibitor was required.

From the propylene and higher olefins present in the gas and gasoline from the reforming of the Tonacinc charging stock, a commercial estimate indicates that 5.2 volume per cent of polymer gasoline can be produced by catalytic polymerization. Alternatively, the butylenes may be used to alkylate isobutane and produce 8.25 volume per cent of butylene alkylate.

TABLE 11—REFORMING TONACINC AND MINANAVY GASOLINES AND TONALA NAPHTHA: PROPERTIES OF PRODUCTS

	Field		
	Tonacinc	Minanavy	Tonala
Untreated gasoline:			
Gravity, °A.P.I.	62.4	57.8	55.1
Color, °Saybolt	12	5	....
Gum, mg./100 ml. (copper dish):			
Without inhibitor	4	24	216
With inhibitor No. 1 (0.025%)	5	15	....
Sulfur, %	0.03	0.06	0.07
Oxygen bomb stability, induction period, min.:			
Without inhibitor	45	30	....
With inhibitor No. 1 (0.025%)	315	230	....
Vapor pressure, (Reid), p.s.i.	10.9	15.0	....
Octane No.:			
Research	81	79	76
A.S.T.M.	75	74	69
100 ml. (A.S.T.M.) distillation:			
I.b.p., °F.	93	99	94
10%	140	146	178
50%	219	246	284
90%	330	348	355
E.b.p.	390	388	408
Residuum:			
Gravity, °A.P.I.	11.2	22.2	8.2
100 ml. distillation:			
I.b.p., °F.	231	300	330
10%	376	358	460
50%	572	440	615
90%	....	721	....
E.b.p.	....	....	....
Distilled over, %	88.0	96.0	89.0
Coke by weight, %	12.2	4.4	11.2
Distilled at 400° F., %	12.0	30.0	5.0
Distilled at 572° F., %	50.0	76.0	40.0

TABLE 12—TREATMENT OF REFORMED TONACINC, MINANAVY AND TONALA GASOLINES, AND PROPERTIES OF PRODUCTS

	Field		
	Tonacinc	Minanavy	Tonala
Acid, lb./bbl.	1.0	1.0	1
Solution, loss, %	0.6	0.6	0.8
Polymerization loss, %	0.0	0.0	0.5
Distillation loss, %	2.3	1.7	1.4
Total loss, %	2.9	3.3	2.7
Treated gasoline:			
Gravity, °A.P.I.	61.9	60.2	58.3
Vapor pressure, (Reid), p.s.i.	6.7	6.5	6.5
Color, °Saybolt	29	28	30
Color stability	27	24	27
Sulfur, %	0.02	0.03	0.05
Gum, mg./100 ml. (copper dish):			
Without inhibitor	2	1	2
With inhibitor No. 1 (0.025%)	3	....	3
Oxygen bomb stability, induction period, min.:			
Without inhibitor	105	75	40
With inhibitor No. 1 (0.025%)	1,240	700	620
Octane No. (A.S.T.M.)	72	72	73
100 ml. A.S.T.M. distillation:			
I.b.p., °F.	112	120	108
10%	148	158	142
50%	218	233	246
90%	280	307	306
E.b.p.	338	360	346
Distilled over, %	97	97	97
Bottoms, %	1.0	1.5	1.0
Loss, %	2.0	1.5	2.0

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Normal Breathing Loss

Have you any information as to normal breathing loss per day, month or year on bulk station gasoline storage tanks of 10,000-16,000-gal. capacity at various atmospheric temperatures over a range from 30° to 90° F.?—P. J. C.

Such figures can be only most approximate. Nevertheless, for a 10-lb. gasoline Chicago Bridge & Iron Works states breathing losses and filling losses, for a temperature of 60° F., as follows:

	Per cent	
	Breathing per year	Each filling
Fixed roof	3.0	0.2
Wiggons breather roof	*1.4	0.2
Balloon roof	0.0	0.18
Pontoon roof	0.85	0.0
2½-lb. pressure tank	0.0	0.10

*If the tank is kept full the loss is nearly zero.

By an inspection of the vapor pressure of such a gasoline at different temperatures it would seem that the losses at various temperatures would be somewhat as follows for a regular fixed-roof tank.

APPROXIMATE LOSSES FROM A FIXED-ROOF GASOLINE TANK FOR A 10-R.V.P. GASOLINE AND A BAROMETRIC PRESSURE OF 14.4 LB.

Temp., °F.	Per cent	
	Breathing loss per year	Filling loss
0	0.56	0.04
20	0.93	0.06
40	1.60	0.11
60	3.00	0.20
80	*5.80	0.39
90	large	0.58
100	large	1.03

*These losses are undoubtedly high because the loss of such amounts would change the composition of the gasoline to such an extent that estimates cannot be made.

Regeneration of Sodium Sulfide

For the past month or so we have been working on a regenerative system for our spent caustic from straightrun naphthas and cracked gasoline. The spent caustic contains sodium sulfide which is interfering with our regeneration system. We have added various compounds, for example hydrated lime, and tried various methods of trying to remove the sodium sulfide but have had no success. Any information concerning this matter would be greatly appreciated.—M. J. S.

Sodium sulfide is an extremely stable compound and this department knows of no method of regeneration that is being practiced in refineries. Perhaps reaction with steel shavings or some other cheap material may be satisfactory. Refiners simply throw away the caustic that is converted into sodium sulfide. Thus, in the various mercaptan-removal processes that employ caustic soda solutions with methanol, solutizers, tannic acid, etc., the hydrogen sulfide is removed by a prewash with caustic soda. The caustic solution used for the removal of hydrogen sulfide is converted into sodium sulfide, and after it loses its effectiveness it is discarded. The cost is not usually great because most gasolines contain much less than 0.006 per cent of hydrogen sulfide. In the catalytic desulfurization processes sulfur compounds are converted into hydrogen sulfide and hence caustic washing may become expensive. This expense is usually avoided by fractionating the hydrogen sulfide out of the gasoline and burning it.

Caustic solutions of 12 to 25 Be. (9-20 per cent sodium hydroxide) have been used for the removal of hydrogen sulfide in a prewash operation. The caustic is seldom used until it is completely spent because of the danger of spoiling the regular caustic regenerator solution. C. M. Ridgway in "Improving Gasoline by Caustic Washing," The Oil and Gas Journal, March 21, 1938, page 83, carefully considers the amount of caustic deterioration that should be permitted before it is discarded.

Other sulfide-removing chemicals than caustic are also widely employed, such as sodium carbonate, sodium phosphate, etc. These can be regenerated.

Evaporation Losses at High Altitudes

We are surveying our gasoline losses at various points on the coast and interior of British Columbia. Cars are loaded at sea level and on arrival at destination the contents check satisfactorily with the quantity loaded but upon unloading into our storage tanks an extra loss of approximately 1 per cent occurs at our inland storage points. Can the altitude cause such a difference?—P. J. C.

Temperature is usually the only factor considered but high altitude would certainly affect the losses. At the point of loading, a loss would occur by gasoline evaporating into and saturating the air, and the vapor space will contain a particular mixture of air and vapor whose composition depends upon the kind of gasoline, the temperature and the barometric pressure. Upon moving the car to a high altitude (lower pressure), the small amount of air-gas mixture in the dome or vapor space will expand into the air but little extra loss will have occurred because any gasoline vapor that gets into the dome is already lost or gone from the shipment.

However, upon transferring the car to a storage tank a loss will occur and the loss will be greater at high altitudes than at sea level. In a most general way and with respect to losses, the gasoline will act as if it has a vapor pressure that is higher than its specified vapor pressure, and by an amount equal to the decrease in the barometric pressure by the high altitude. Thus, at 15,000 ft. the barometric pressure is only 8.3 lb. per sq. in., and hence an 8.3 Reid vapor-pressure gasoline would not only actively vaporize but would boil. As a more complete example, consider a gasoline that has a vapor pressure of 6.9 lb. absolute at 80° F. (about 8.5 R.v.p.). The composition of the vapor-air mixture that will be produced in the vapor space of the tank, when at different altitudes will be somewhat as follows:

EFFECT OF ALTITUDE ON GASOLINE TANK-FILLING LOSSES

Altitude—	Barometric pressure (p.s.i.)	Per cent gasoline in vapor mixture	Cubic feet vapor lost per cu. ft. air	Relative loss
Sea level	14.7	47.0	0.89	1.0
5,000 ft.	12.25	56.0	1.27	1.5
10,000 ft.	10.3	67.0	2.03	2.3
15,000 ft.	8.3	83.0	4.88	5.5
20,000 ft.	7.0	99.0	99.00	111.0
30,000 ft.	4.9	boils	(*)	(*)

*Gasoline boils off pure vapor until the vapor pressure of the residue is down to 4.9 p.s.i. at the tank temperature.

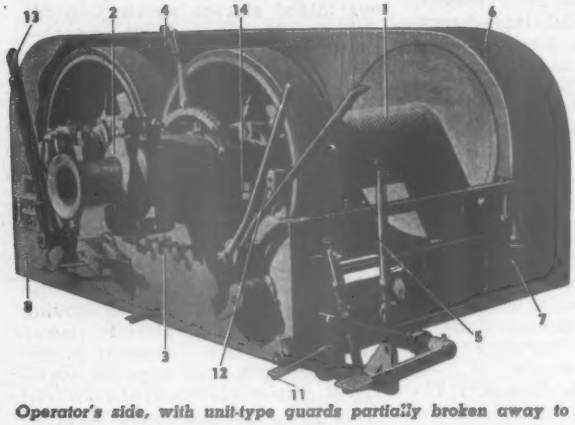
Note that the loss by evaporation is about 2.5 times larger at 12,000-ft. elevation than at sea level.

MODERN DRILLING

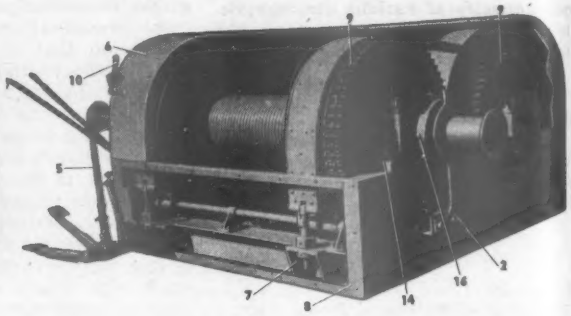
A JOURNAL SERIES ON NEWEST DEVELOPMENTS IN ROTARY RIGS

Mechanical Specifications

BECAUSE of the wide variance of field conditions, the hoists installed in portable well-servicing and drilling units cannot be constructed according to a single design but must be adapted to meet specific requirements. It is therefore impossible to give here a detailed and rigid set of specifications. However, the basic features of all Hopper hoists conform to the following descriptions. The unit is manufactured by Hopper Machine Works, Inc., Bakersfield, Calif.

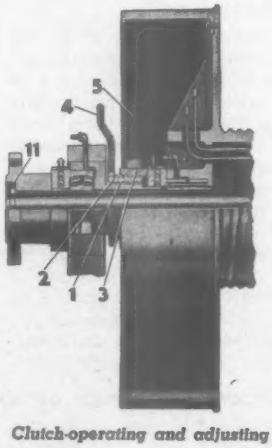


Operator's side, with unit-type guards partially broken away to show parts



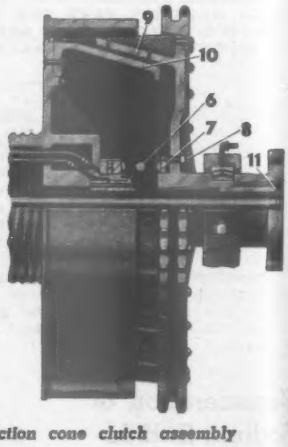
Cathead side, showing machine-cut sprockets on hoisting drum and sand reel

1. **Drum core:** Furnished plain or grooved, as specified. Split grooved sleeves are furnished to attach over plain drums, if desired.
2. **Catline safety guards and grips:** Optional equipment furnished at extra cost.
3. **Lubrication and brake-cooling systems:** The grease fittings and water-control valves are grouped conveniently on the operator's side.
4. **Clutch adjustment:** A single external lever on the operator's side controls all clutch adjustments.
5. **Transmission controls:** A single lever controls all forward pulling speeds. Reverse is controlled by a separate lever, thus eliminating the possibility of accidentally shifting into reverse.
6. **Unit guards:** All moving parts are completely covered by unit-type guards which are put on or removed in one piece, without disassembling levers or other parts.
7. **Brake adjustment:** Adjusting nuts are easily accessible from the outside, without removing guards.
8. **Frame:** All-welded fabricated steel construction, designed for maximum strength and rigidity with minimum weight.
9. **Drive sprockets:** Machine-cut teeth accurately fit the multiple-roller chain.
10. **Hand-throttle control:** A rigidly mounted hand throttle which can be set to govern motor speed is provided for use while rotating during drilling.
11. **Foot-throttle control:** The flexible spring-loaded foot throttle is used for pulling operations.
12. **Prime-mover ignition:** Both the ignition switch and starter button are conveniently located at the operator's position.
13. **Sand-reel controls:** The general layout and functions of the sand-reel controls are identical with those for the main hoisting drum. This feature avoids confusion when the operator changes from one to the other.
14. **Frame connections:** Large-diameter alloy steel bolts with double lock nuts insure rigid and permanent mounting of the drum assemblies on the frame.
15. **Lubrication lines:** Completely enclosed by the guards, all lubrication lines are fully protected against breakage.
16. **Attachment flange:** The Hopper friction rotary drive, plain cathead, automatic make-and-break cathead, or any desired combination of these may be mounted on this flange. Power is obtained through the hub of the drum shaft drive sprocket, not through auxiliary chain drives or countershafts.



Clutch-operating and adjusting assembly

1. Thrust screw
2. Adjustment nut
3. Engagement thrust nut
4. Adjustment nut grip
5. Engagement thrust nut grip
6. Thrust spring
7. Thrust spring plate
8. Thrust spring adjusting screws
9. External clutch cone and lining
10. Internal clutch cone
11. Thrust lock ring



Friction cone clutch assembly

Normally, with engagement thrust nut (3) in backed-off position, the thrust spring (6) forces the entire drum along the shaft, acting to disengage the clutch. Under this condition the drum is entirely free, rotating on its own shaft bearings and controlled only by the brakes.

The clutch is engaged by rotating the thrust nut by means of the clutch control lever. In effect, this increases the length of the component parts assembled on the drum shaft between the two thrust lock rings (11), thus moving the drum along the shaft against the spring pressure, and forcing the internal and external clutch cones into engagement. Engagement of the clutch by this method, controlled as it is by the rotation of a nut on a screw, can be as slow or as fast as the operator may desire, but it is always smooth in action. "Snap-over-center" characteristics are nonexistent in the Hopper friction cone clutch.

Salient features of Hopper PORTABLE drilling and servicing units

MODERN DRILLING

THE design of the friction cone clutch is such that the alloy steel shaft is subjected to no driving torque and to practically no bending stresses during hoisting operation. Torque is imposed on the drum shaft only when using the rope-spinning cathead. Driving torque for the friction rotary drive and automatic cathead is transmitted through the sleeves of the drive sprocket hub.

Drum

Mounted on its own bearings, the drum rotates freely on the shaft when clutch is disengaged. This feature eliminates all drag when going into the hole, and permits exceptionally fast lowering of the traveling block. Drum is of all-welded fabricated steel construction.

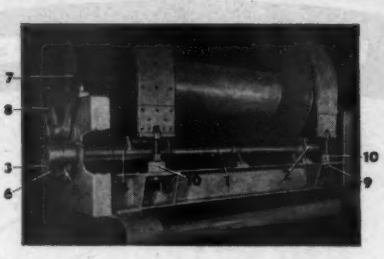
Bearings

Thrust bearings are heat treated, hardened and ground alloy steel manufactured by Hopper machine works. Shaft bearings are self-aligning spherical roller type, with sealed steel housings on heavy units and straight roller type on light units.

Self-Energizing Brakes

The high leverage ratio, self-energizing characteristics, and automatic equalizing feature of the brakes make them positive in their braking action and easy to operate. They are adjustable at two readily accessible points and so may be kept in prime operating condition with a minimum of attention.

The equalizing principle is as follows: The brake shaft (1) is rigidly supported by three bearings, and is keyed to the right brake throw (2) and outside equalizer arm (3).



The left brake throw (4) floats on the brake shaft and is keyed to the inside equalizer arm (5). Equalizer arms (3 and 5) are tied together by means of the ball toggle arm (6), the toggle arm being in turn direct-connected to the brake lever (7) by means of the multiplying gooseneck lever (8).

Pressure on the brake lever is transmitted equally to both brake bands through the toggle arm and the connecting members. The overall leverage ratio of this braking system is 52¾ to 1.

The solid anchorage on the dead end of the brakes allows the self-energizing principle to work to its fullest advantage and results in the braking assembly being smooth acting and "kick free."

Both brake bands are adjustable at the dead end by means of internally and externally threaded anchor flanges (9) and oversize lock nuts (10). The brake adjustment can be made without removing any guards.

Lubrication

Grease connections through which all major points are lubricated are grouped on and near a panel on the operator's side. This makes them not only readily accessible but also acts as a reminder.

Three valves control the brake-cooling water. The lower valve is the master valve and permits the incoming water to be shut off completely without disturbing the adjustment of the upper valves which control the water flow to the two brake drums.

Portable Features

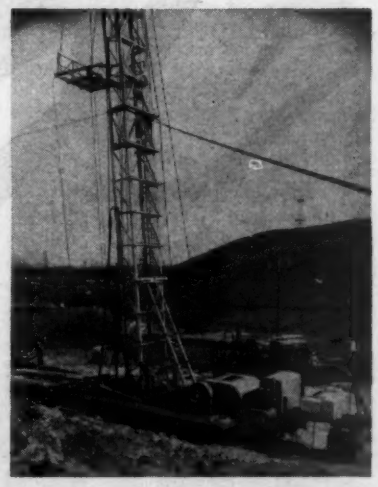
The general compactness of Hopper hoists makes them readily adaptable to mounting on skids, trucks, trailers, track-type tractors and other mobile units. They can be combined with all types of portable masts and derricks for both remedial and drilling work.

"Blitz-rig" is a term applied to the latest-type deep-well servicing and slim-hole drilling outfits because of the speed with which they can be moved from location to location, and the fast setup that can be made at the job.

They can be furnished in a very wide range of operating capacity. Any specifications for portable well servicing and slim-hole drilling equipment can be met.

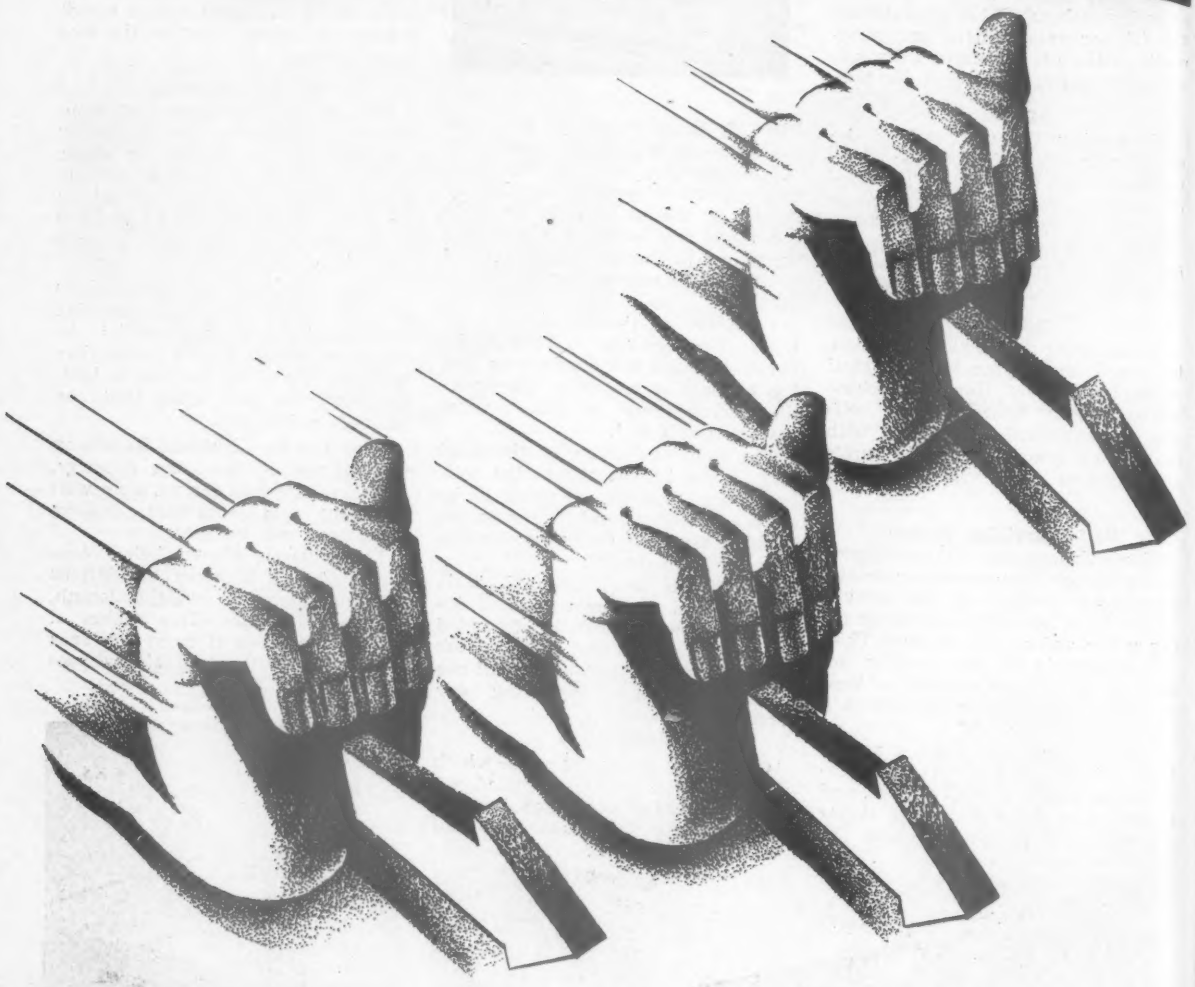
The Blitz-rig shown below conforms to the highway regulations of many states in weight, length, width and height. This makes it possible to move it from one area to another without obtaining special permits.

Blitz-rig ready for the road with extension mast down and lashed for traveling



Blitz-rig backed into position at well with first stage of mast raised. Guys are carried attached to mast ready to be connected to dead men. Lines, traveling blocks and hook are carried already strung up

THREE NEW PARTNERS . . . GOING



TERMINAL TOWER
CLEVELAND, OHIO

Core Data as a Production Tool

*by Park J. Jones**

Mechanics of Producing Oil, Condensate, and Natural Gas

PART 6 OF A SERIES

There are many production problems, for example: estimating the vertical and areal distribution of pay in a reservoir, estimating the elevation of water and gas contacts, estimating reserves, and determination where and how wells should be completed. The correct solution of these and other problems depends on factual information. The methods employed to obtain facts may be called production tools.

Core data are such a production tool. Core data, when applied in conjunction with other production tools, help producers to solve their problems. Core data include (1) description of the cores recovered and sampled, and (2) the results of core-sample analysis.

Core data may be used for estimating gas contacts, feet of pay in a well, porosity of the pay in a well, permeability or quality of the pay in a well, and interstitial water for the pay in a well. Still other applications of core data will be considered in later articles.

ILLUSTRATED in Fig. 6-1 is a form which may be used for core description and sampling. This form should include data pertinent to core recovery, core samples taken, lithology, stratigraphy, structure, and fluid content. The person "sitting on a well" is the only one who has an opportunity to observe all of these, sample the cores recovered, and record the description which is so essential to practical application of core data.

The conditions attending coring operations may influence core recovery. The manner in which coring is performed may also be helpful in estimating the intervals of no recovery. So it may be advisable to record such items as the weight on core bits, pump pressures, coring time in minutes per foot, and type and size of core heads.

Core Description

Core description should include (1) the composition, texture, size, shape, and degree of sorting of particles, (2) the composition and texture of bonding materials, (3) a description of the mass features of cores as to lithology, stratigraphy, structure, texture, degree of cementation, and color, and (4) the depth of oil shows, cuts, odors, and bleeding cores. Data on dips from several cored wells may be significant.

Observations on primary and secondary porosity may be pertinent. Fractures, joints, cracks, solution channels, stylolites, and cavities should be recorded. In other words, the person describing cores should be familiar with the principles of stratigraphy and with the characteristics of media from the viewpoint of producing oil, gas, and water.

*Production consultant, Houston.

CORE DESCRIPTION AND SAMPLING

COMPANY _____ FIELD _____

LEASE & WELL NO. _____ SYMBOL _____

SEC.-TWP.-RGE. _____ CO. or PH. _____ STATE _____

FORMATION _____ SIZE & TYPE CORES _____

ELEVATION _____ CORING DATES _____

DEPTH	LOG	SAMPLE NUMBER	FEET REPRESENTED	DESCRIPTION
XX10				
XX11				
XX20				

DISPOSITION OF SAMPLES _____

DESCRIBED & SAMPLED BY _____

DATE _____

Fig. 6-1: Illustrating a form for core description and core sampling

Sampling Cores

For accurate determination in a laboratory of porosity, permeability, and liquid and water saturation, a sample on the order of 1.5 in. long and 2.5 in. in diameter is required. The length for other diameters should be proportional to the foregoing volume. The laboratory tests are interrelated; therefore, a uniform sample is required. Nonpay and intervals of pay which are too thin for laboratory purposes should not be sampled. However, if there be any doubt as to pay and nonpay a sample should be taken.

If pay intervals are thin, or, if the distribution of porosity and permeability is not uniform; the results obtained in a laboratory may be misleading. The person who describes and samples cores is the only one who knows (1) the number of feet, or fraction of a foot, a sample represents, (2) the degree of uniformity of porosity distribution, and (3) the degree of uniformity of permeability distribution. The evidence for item (3) is bleeding cores and nonuniform distribution of small-scale structure.

The frequency of sampling should be not less than one sample for each foot of penetration, provided there be sufficient uniform pay from which an adequate sample can be obtained. Each sample should be numbered. An identification symbol based on company, lease, and well number is convenient.

Shipping Samples

Core samples may be analyzed in a portable laboratory at a well or shipped to a laboratory. For ship-

The "Rolling Dog" principle of

MISSION SLIPS

protects your Drill pipe

...speeds up round trips

Mission One-Piece Extra-Long Rotary Slips

THE ROLLING DOGS protect your drill pipe by giving a gradual, cushioning grip instead of cutting or bottlenecking.

SMALL, NON-CONTINUOUS TEETH . . . further protect your pipe by preventing undue stress concentration.

FASTER ROUND TRIPS: The action of the rolling dogs gives a positive grip and instant release, factors which make for *faster, safer handling of pipe.*

●

Protect your pipe by using Mission

PROTECT YOUR DRILL PIPE, CASING AND TUBING BY USING MISSION "ROLLING DOG" SLIPS

Mission MANUFACTURING CO.

HUMBLE ROAD HOUSTON, TEXAS

4A-18

CORE SAMPLE ANALYSIS

COMPANY _____ FIELD _____

LEASE & WELL NO. _____ LAB. RPT. NO. _____

ANALYSIS DATE _____ ANALYST _____

SAMPLE NUMBER	DEPTH FROM	DEPTH TO	PERMEABILITY MILLIDARCYS	POROSITY %	SATURATION % POROSITY		REMARKS
					RESIDUAL LIQUID	TOTAL WATER	

DATES: CORING _____ REC'D. SAMPLES _____

Fig. 6-2: Illustrating a form for core-sample analysis

ping purposes, samples are sealed in cans or jars together with a slip of paper, wrapped in wax paper, showing sample number, depth, feet of pay represented, and symbol. Sample number, depth and symbol are also placed on the outside of the sample container. A letter notifying a shipment of core samples should be sent to the laboratory.

Forms for Sample Analyses and Logs

Fig. 6-2 illustrates a form which may be used for tabulating the results of core-sample analyses. Fig. 6-3 illustrates a form which may be used for plotting core data logs. The scale for core data logs may be on rolls of tracing paper. The heading may be printed on tracing cloth. In practice, core-data logs may also contain interpretations as to water and gas contacts; also, recommendations as to completions, perforating depths, and workovers.

Still other core data may be pertinent. For example, particle-size analyses may be required. Solubility in acids, the chloride content of water, and water saturation vs. capillary pressure studies may be in order. The resistivity of the core samples at 100 per cent saturation with reservoir water may be needed.

Opportunity for Improvement

The foregoing discussion on forms, description of cores, sampling of cores, and core analysis is along general lines. To meet the requirements of particular types of media and subsurface conditions, particular forms, scales, and techniques may be advantageous.

An ample opportunity exists for improving core recovery, core sampling, and core description. There is also an opportunity for a production tool which would give the information furnished by core data and at the same time be a less costly service.

Gas Contact in a Well

The elevation of the contact between a reservoir liquid and a reservoir gas is a level below which reservoir gas is not producible initially. This level is called the gas contact. The gas contact in a well may be estimated usually from the difference in residual liquid saturation in cores. However, there are exceptions. The thickness of the zone of transition from a high gas-oil ratio reservoir liquid to a wet, or retrograde, gas cap may be on the order of 8 ft. Core samples from such zones of transition may show only negligible differences in residual liquid saturation. Consequently, drill-stem or production tests may be required in some instances to confirm estimates of gas contacts from core data. The gas contact in one well is not necessarily the gas contact for all other wells in a given reservoir.

Water Contact in a Well

The elevation of the contact between water and a reservoir liquid, or a reservoir gas, is a level below which recoverable reservoir fluids occur only in negligible quantities. Such levels are called water contacts.

The zone of transition from water to a reservoir gas is commonly less than 6 ft. thick. The water contact for a gas well is usually selected from electric logs. If electric log data are not reliable or available, drill-stem or production tests are required. The water contact in one gas well is not necessarily the water contact for all the wells in a given gas reservoir.

The thicknesses of the zones of transition from water to reservoir liquids found in practice vary anywhere from 6 ft. up to 30 ft. If the characteristics of the media in a zone of transition alternate, some beds may produce pipe-line oil and others chiefly water. Reservoirs are known in which nonrecoverable reservoir liquid occurs below their water contacts which were established by production tests. Residual liquid saturation in cores is not proof that media will produce oil. They may produce 100 per cent water. Electric-log data are not always reliable, either. Consequently, estimates of water contacts in some liquid reservoirs may have to be confirmed by drill-stem or production test. The water contact for one oil well is not necessarily the water contact for all the wells in a given reservoir.

Feet of Pay in a Well

Assuming 100 per cent core recovery, total penetration of pay, and a reliable description of cores as to pay and nonpay, the number of feet of pay in a well is defined by

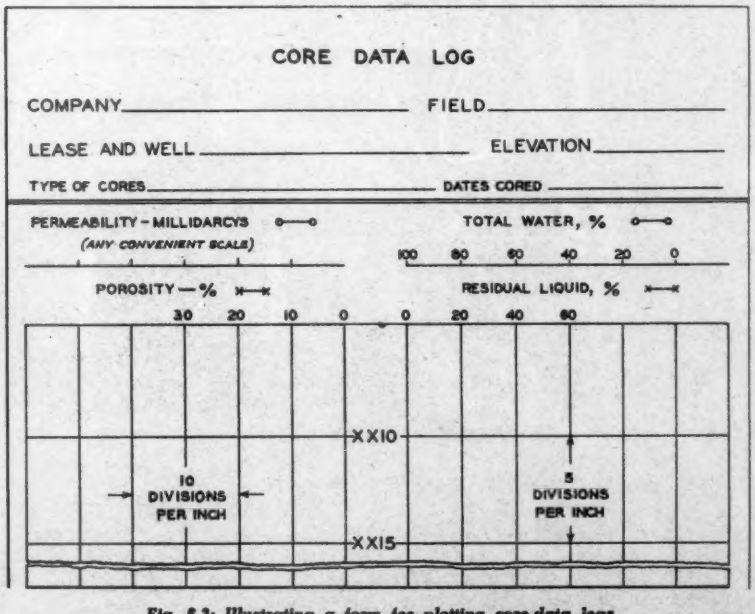


Fig. 6-3: Illustrating a form for plotting core-data logs

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$$h_w = \sum_{i=1}^{n} h_i \qquad (1)$$

Where

h_w = feet of pay in a well

h_i = feet of pay represented by the ith core sample

n = number of core samples

The distribution of pay in the intervals of no recovery and no coring may be estimated by correlating the available core data with electric logs. The number of feet of pay in a well as defined by Equation 1 is based on the assumption that pay can be differentiated from nonpay. In practice, it may be impossible to classify some media as to pay and nonpay from core data alone. For example, the permeability of some limestone, dolomite, and very fine sandstone or argillaceous core samples may be on the order of 1 millidarcy or less, yet 500-bbl.-per-day wells have been completed in such pay.

Porosity of the Pay in a Well

Assuming 100 per cent core recovery, total penetration of pay, accurate core description, and proper sampling of cores (especially for calcareous media having secondary porosity); the average porosity of the pay in a well is defined by

$$f_w = \frac{1}{h_w} \sum_{i=1}^{n} h_i f_i \qquad (2)$$

Where

f_w = average porosity of the pay in a well

f_i = porosity of the h_i pay interval

Well porosity, as defined by Equation 2, is a function of pay thickness. Consequently, the limitations on estimates of pay from core data also apply to estimates of porosity. The porosity of the pay in the intervals of no core recovery and no coring may be estimated by correlating available core data with electric logs.

Quality of Pay

The quality of a pay may be expressed in terms of rate of recovery and ultimate recovery. Other things equal, the quality of a pay is indicated by permeability and interstitial water.

If the permeability of the pay in a well ranges, for example, from 10 millidarcys up to more than 1,000 millidarcys, the quality of pay may may be designated as in the following illustrative example:

Quality of pay	Poor	Average	Good
Permeability range, mds.	10-100	100-1,000	1,000+
Feet of pay	6	32	12
% of total pay	12	64	24

The vertical distribution of the quality of pay is indicated by permeability profiles for wells. If the quality of pay for a given stratigraphic interval can be correlated areally across a reservoir, permeability profiles are significant. Areal distribution of pay quality by stratigraphic intervals will be considered in later articles.

Interstitial Water for a Well

If a pay can be identified as to type of media, its interstitial water may be estimated with the aid of Fig. 5-2. Let W_i equal the water saturation for the h_i pay interval and let there be n such intervals in a well. The estimated interstitial water W_w for the pay in a well is then defined by

$$W_w = \frac{1}{h_w f_w} \sum_{i=1}^{n} f_i h_i W_i \qquad (3)$$

The results obtained by Equation 3 probably should be checked with the results obtained from electric-log data and possibly capillary data. Procedures on estimating interstitial water for entire reservoirs will be considered in a later article.

References

1. Barnes, K. B., A.P.I. 1936.
2. Botset, H. G., A.I.M.E., TP No. 1025.
3. Krumbein, W. C., A.I.M.E., TP No. 1492.
4. Law, J., A.I.M.E., TP No. 1732.
5. Lewis, J. A., A.I.M.E., TP No. 1487.
6. Plummer and Tapp, A.A.P.G, Vol. 27, No. 1, Jan. 1943.

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Alarm System Float Switch

MADE in the plant machine shop from miscellaneous salvaged parts, the float switch shown in the photograph can be used to operate various alarm systems. Incorporated into an alarm circuit which operates a remotely located signal, the assembly has been in service for several years at Sinclair Refining Co.'s Sand Springs, Okla., refinery. Constructed in accordance with details worked out by G. W. Hadley, this unit is used to warn the operators when a predetermined high level has been reached in an atmospheric pressure vessel. Several of the float switches are used in nonpressure installations in both high-level and low-level services.

A discarded water column alarm float, if available, will simplify the assembly problem but a suitable

float may be worked up from light-gage sheet steel if a salvable float is not available. When making the float care should be given to tightness and uniformity of the cylindrical portion and alignment of the float rod with the float, otherwise binding of the body and rod guide or a leak may cause failure in operation.

The outside or body is made from 3-in. standard pipe which has had the inside wall worked smooth with an abrasive. Normal pits are not objectionable but the pipe must have all sharp projections removed.

One end of the 3-in. pipe is threaded for attaching a standard 3-in. flange with a cover plate; the plain end is closed with a ½-in. thick circular plate which is fillet welded to the inside wall.

Dimensions of the ½-in. thick cover plate meet the standard 3-in.-flange drilling; a ¾-in. pipe tap is made in the center of the plate for the float rod guide and upper pipe connection. A ¾-in. pipe tap is made in the center of the bottom closure plate for the lower pipe connection.

Standard ¾-in. pipe having the inside wall smoothed serves as the float-rod guide. In order to maintain alignment of the float rod guide and the body, the pipe and fittings should be made up into the cover plate and the assembly bored with a ⅞-in. drill on the I.D. of the ¾-in. pipe with the cover plate resting on face plate of drilling machine.

After being made up, the face of the 3-in. flange should be tried for squareness with the 3-in. pipe body. A one-eighth inch out of square on the flange diameter is not objectionable; if more than ⅛ in. is found the assembly should be set up in a lathe and flange faced off square.

Switch arm and fulcrum are made of flat bar steel and attached to the float rod guide by clamping with bolts. A standard commercial-type mercury switch is used.

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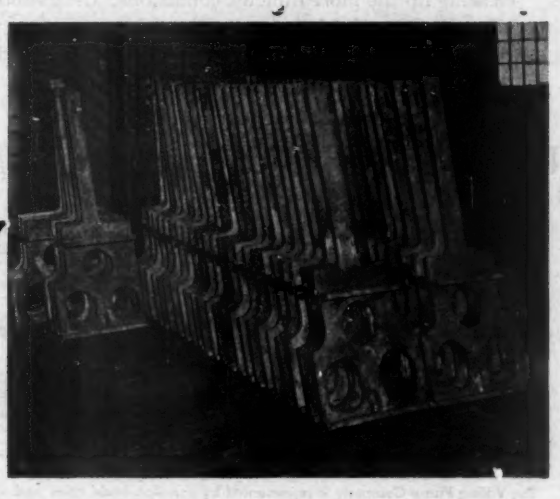

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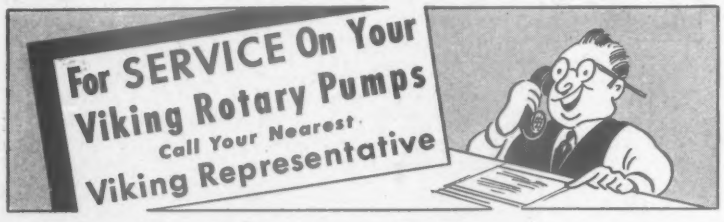

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Engineering Fundamentals

No. 163

A FEATURE OF THE OIL AND GAS JOURNAL

Calculating Porosity of Reservoirs

SO much has been written about porosity and permeability measurements and their application to the petroleum engineering work that nearly everyone interested in oil fields is familiar with these factors and their usefulness. This article is intended to describe a less well-known method of determining porosity. The method requires little apparatus and saves much time, yet it is reasonably accurate.

Effective porosity is the ratio of the volume of interconnected pore space to the total bulk volume of the oil sand expressed in percentage of pore space. From the weight of a comparatively nonvolatile liquid which has filled all of the connected pores of a sample the porosity may be determined:

$$\text{Per cent porosity} = \frac{\text{Pore volume}}{\text{Bulk volume}}$$

$$\times 100 = \frac{(W^w - W^d)/D_L}{\text{Vol. of displaced fluid}} \times 100$$

Fig. 1: Russell porosity apparatus for determining volume of small samples

W^d = weight of sample clean and dry. It is best to first remove the oil from the sand by extracting with a solvent, then dry and weigh.

W^w = weight of the sample completely saturated with a liquid (L) of known density (D). Since the liquid tends to drain out while weighing, it is possible to weigh the sample in the liquid and calculate its weight in air as follows:

Weight in air = density of L × bulk volume + weight in L.

Bulk volume = total volume of the chunk of rock. It is best determined by measuring or weighing the volume of fluid of known density which it displaces. This is commonly done in a Russell volumeter (Fig. 1) or, if the chunk is large, in some other form of pycnometer (Fig. 2).

This procedure involves six separate operations, considerable care, and the measuring of a large number of samples in order to obtain an accurate average figure. The results are important, however, since, if the oil sand is completely filled with oil, the porosity is a measure of volume of oil in a reservoir.

Recently Fancher has suggested and Murray[2] has tested extensively an approximate density method which saves much time. It is well known that the density of rock grains in different parts of an oil sand vary only slightly. Hence, once the average density of several chunks of the rock is determined, this figure can be used in all further approximate determinations. Furthermore, if the rock is a fairly pure sandstone, no matter what region it comes from, its grains have a density near that of quartz or 2.654, and if the rock is a fairly pure oolite, they will have a density near that of calcite of 2.717. Most oil sands have a density of between 2.6 and 2.7. The following table by Murray is typical:

DENSITIES OF 10 SAMPLES OF STRAWN OIL SAND

2.668	2.667	2.668	2.670
2.667	2.668	2.668	
2.670	2.666	2.666	Av. 2.6678

This uniformity of densities makes it possible to calculate with a fair degree of accuracy the porosity of a silica sand or oolitic limestone with only the bulk volume and dry weight of the sample known. Thus:

$$\text{Per cent porosity} = (1 - D_b/D_s) \times 100$$

D_b = apparent density of the bulk sample, and D_s = actual density of the sand grains.

Sand grain density (D_s) can be estimated from previous work. Usually the figure 2.66 is quite accurate. The method of determining D_s is as follows:

$$\text{Sand density } (D_s) = \frac{W_d}{V_s} = \frac{W_d}{(W_d - W_s)/D} = \frac{W_d \times D}{(W_d - W_s)}$$

W_d = weight of the sample dry, W_s = weight of sample suspended in liquid, D = density of the liquid used, and V_s = volume of the sand grains determined in a pycnometer.

The apparent density or bulk of the sample (D_b) may be determined by weighing the sample dry and then measuring the bulk by displacing its volume of fluid in a Russell volumeter or other apparatus. Gravity and porosity measurements of typical rocks determined by this method are given below.

DENSITY AND POROSITY OF OIL SANDS FROM TEXAS

Rock—	Density, per cent			Porosity, per cent		
	Max.	Min.	Avg.*	Max.	Min.	Avg.*
Woodbine oil sand	2.680	2.64	2.660	32.00	21.85	25.83
Glenrose oolitic sand	2.530	2.70	2.640	13.62	22.90	17.40
Travis Peak sand	2.680	2.74	2.685	14.30	14.30	14.30
Strawn oil sand	2.667	2.67	2.668	24.60	23.60	24.20
Marble Falls oolitic limestone	2.690	2.71	2.700	7.35	20.68	18.00

*Average of 10 determinations.

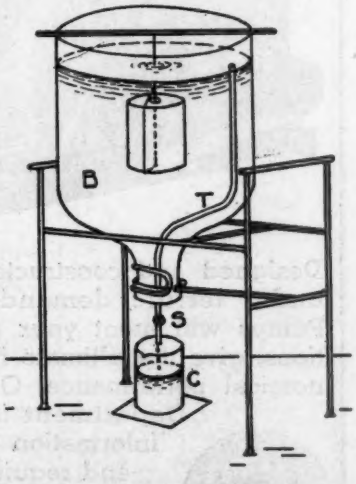


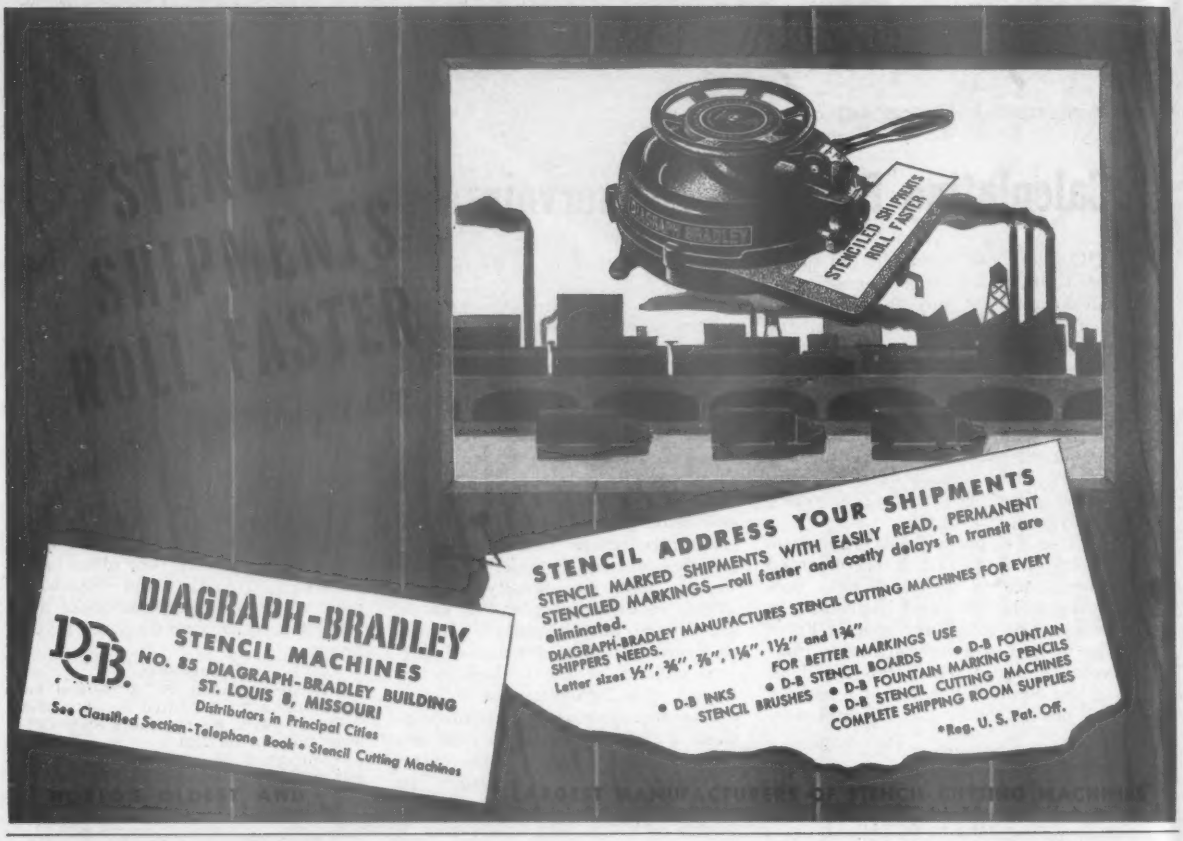
Fig. 2: Apparatus used in measuring volume of large core samples

References

1. Barnes, Kenneth B., A Method for Determining the Effective Porosity of a Reservoir Rock, Pennsylvania State College, Bulletin 10, 1931.

2. Murray, J. M., Jr., A Critical Analysis of Laboratory Methods of Testing Oil Sands, University of Texas Thesis, Department of Petroleum Engineering, 1937.

Series prepared by F. B. Plummer, professor, petroleum engineering school, University of Texas



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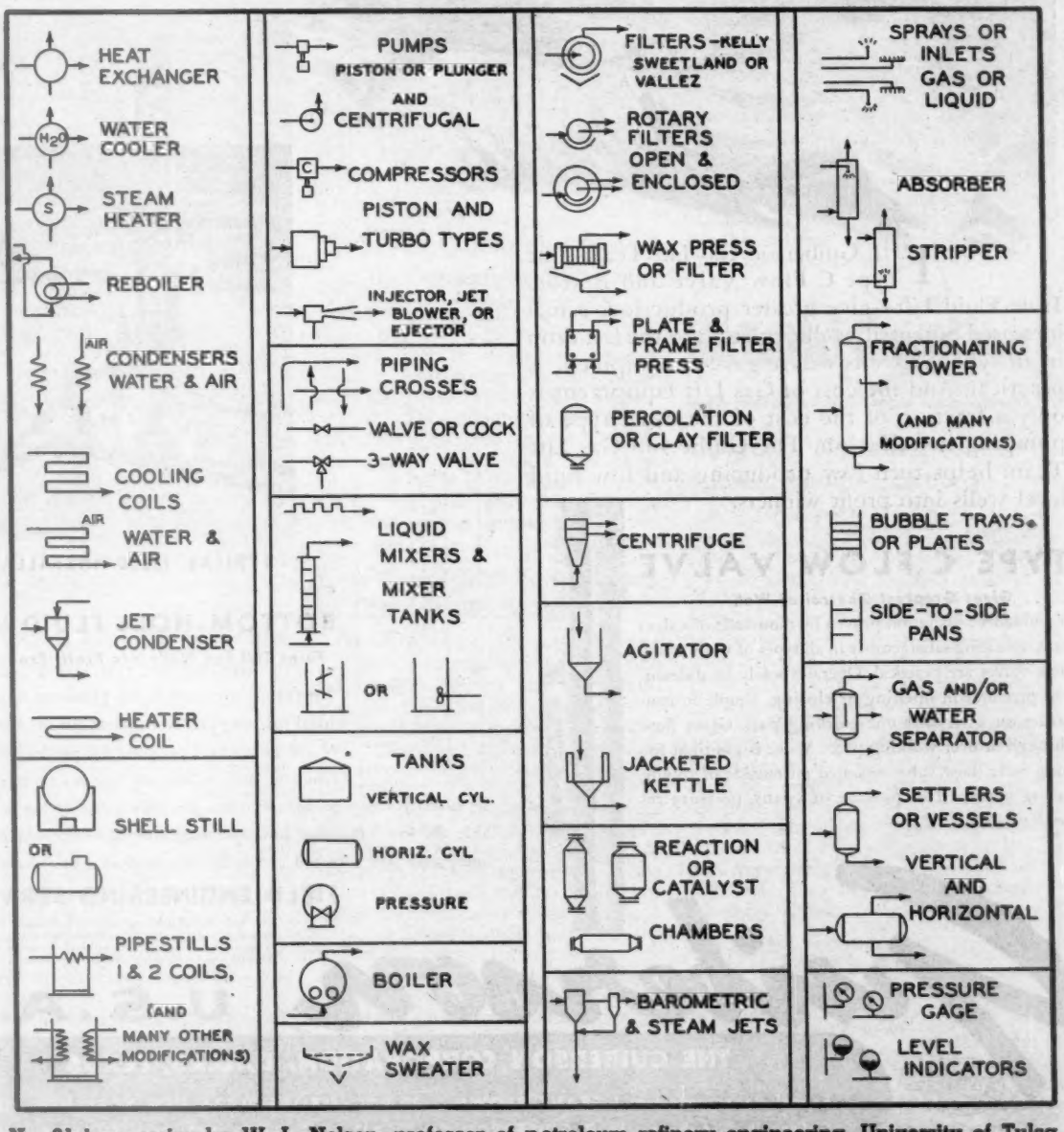
The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Standard Diagram Symbols

THE symbols used for diagrams have not been standardized. The efforts of the Hague technical department of Royal Dutch-Shell Co. as published in "A Petroleum Handbook" of that company is the only recommendation available and it has been incorporated to a large extent in the symbols given here.

Really useful symbols must be a compromise between the need of simplicity and the quality of calling to mind the equipment represented. If anyone has symbols or improvements to suggest, they will be welcome. Obviously, many special symbols will be devised as needed.



No. 21 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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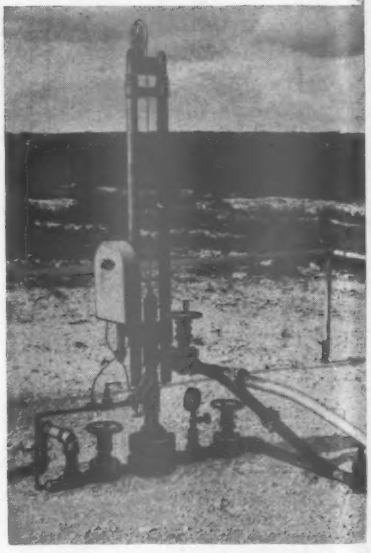

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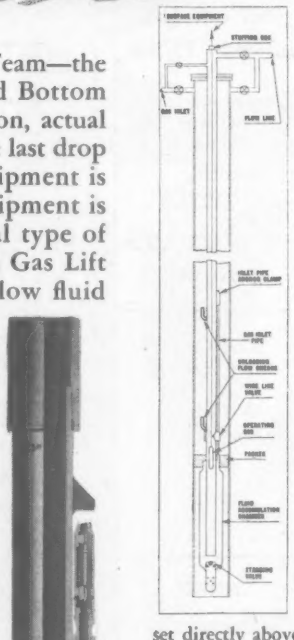

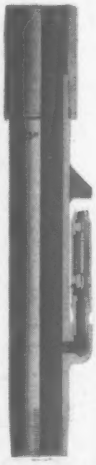

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Natural Gas

West Panhandle's Sour-Gas Allowable Is Announced

AUSTIN.—Following a series of hearings the Texas Railroad Commission fixed 721,536,000 cu. ft. daily as the allowable production of sour natural gas in the West Panhandle field. The order based on its finding was effective December 1.

The commission found that the producing capacity of sour-gas wells in the field to be in excess of reasonable demand and that to prevent or minimize cognizable and preventable drainage it was necessary to restrict production and to prorate demand.

Marked Rise Recorded in Demand for Hugoton Gas

OKLAHOMA CITY.—Following a 2-day hearing on market demand the Oklahoma Corporation Commission last week fixed the December allowable gas production in the Texas County sector of the Hugoton field at 207,900,000 cu. ft. daily, a new high. It was explained that interstate pipe lines were stepping up their takings in order to meet industrial demands in the central and northern states. The daily allowable for the Chickasha field was fixed at 94,355,000 cu. ft. and for Cement 23,626,000.

Method of Making Gasoline From Methane Perfected

AUSTIN. — Returning last week from Olean, N. Y., where he had witnessed demonstration of a process for converting methane (dry gas) into gasoline, Col. E. O. Thompson, member of the Texas Railroad Commission, pronounced the method a definite success. The procedure, developed by C. P. Keith, native of Texas, "makes the value of gas approach that of petroleum," Thompson said, adding that the innovation would mean much to landowners, oil and gas operators and the state.

"Methane is what is left after all the liquid hydrocarbons, like butane and propane, have been extracted from the natural gas," Thompson explained. "It is said that the meat packer gets everything out of the pig but the squeal. Methane is the squeal of the pig, and this process uses the squeal of the gas—the skim milk.

"Some gas wells in Texas are closed in because of no market. Gas has been selling for as little as 1, 2, 3 and 4 cents a thousand. Now with this process, a demonstrated success, gas becomes worth perhaps 10 cents a thousand at the well.

"A plant that will use 64,000,000 cu. ft. of methane per day will produce about 6,000 bbl. of 83-octane gasoline daily. That means, roughly, a barrel of gasoline (42 gal.) from each 10,500 ft. of methane.

"These plants can be erected in Texas at the gas fields, providing outlets for gas in fields that do not have pipe-line connections."

Michigan Consumers Get Cut in December Bills

LANSING. — Michigan Consolidated Gas Co. will reduce its December bills to consumers 31 per cent, in conformity with an order from the State Public Service Commission. This action eliminates an estimated $1,000,000 charge for federal excess profits taxes. The commission's order is the third reducing public utilities' customer bills to eliminate excess profits taxes.

New Precedent Established In Carbon-Black Permit

OKLAHOMA CITY. — Departing sharply from previous practice and setting up a wholly new precedent, the state Corporation Commission last week issued an order permitting Cabot Carbon Co. to build a channel-process carbon-black plant near Guymon, in the Texas County sector of the big Hugoton gas field. Heretofore the commission has held rigidly to its rule refusing to allow use of sweet natural gas for carbon black unless there was no other market and the gas was being wasted.

Cabot asked authorization for the $1,500,000 plant at the request of War Production Board. Following a hearing the commission took the case under advisement. Recently the chemical division of WPB wired the commission urging issuance of the permit in the interest of the war program.

The permit was issued for the duration of the war and 6 months thereafter only, thus classifying it as temporary.

Price of gas was set at 5 cents per 1,000 ft., which is 1 cent higher than the ceiling price approved by Office of Price Administration for other plants at Guymon.

The order directs the company to purchase gas ratably and equitably from all wells or leases where they can be "reasonably reached" by the company's pipe lines. The company will be permitted up to 30,000,000 cu. ft. of gas a day in operation of the plant. This was the figure set by Cabot in its petition.

The Cabot company will construct and operate the plant which will be owned by Defense Supplies Corp.

Hearing on Longevity of Gas Area Is Ordered

AUSTIN.—Upon request of Chicago Corp. and Gulf Plains Corp. the Texas Railroad Commission will hold a hearing December 18 on the question of how long gas properties will continue to produce in the Stratton-Agua Dulce area, near Corpus Christi. The applicants said they planned to bring expert witnesses on the subject of reservoir depletion and wasteful production.

Natural Gasoline

Output of Natural Gasoline Scores Another Record

WASHINGTON. — Daily average output of natural gasoline and allied products registered another new high in September, with a total of 11,827,000 gal., compared with 11,641,000 in August and with 10,503,000 in September 1943. The principal gains were in the Panhandle, Oklahoma, West Virginia and California.

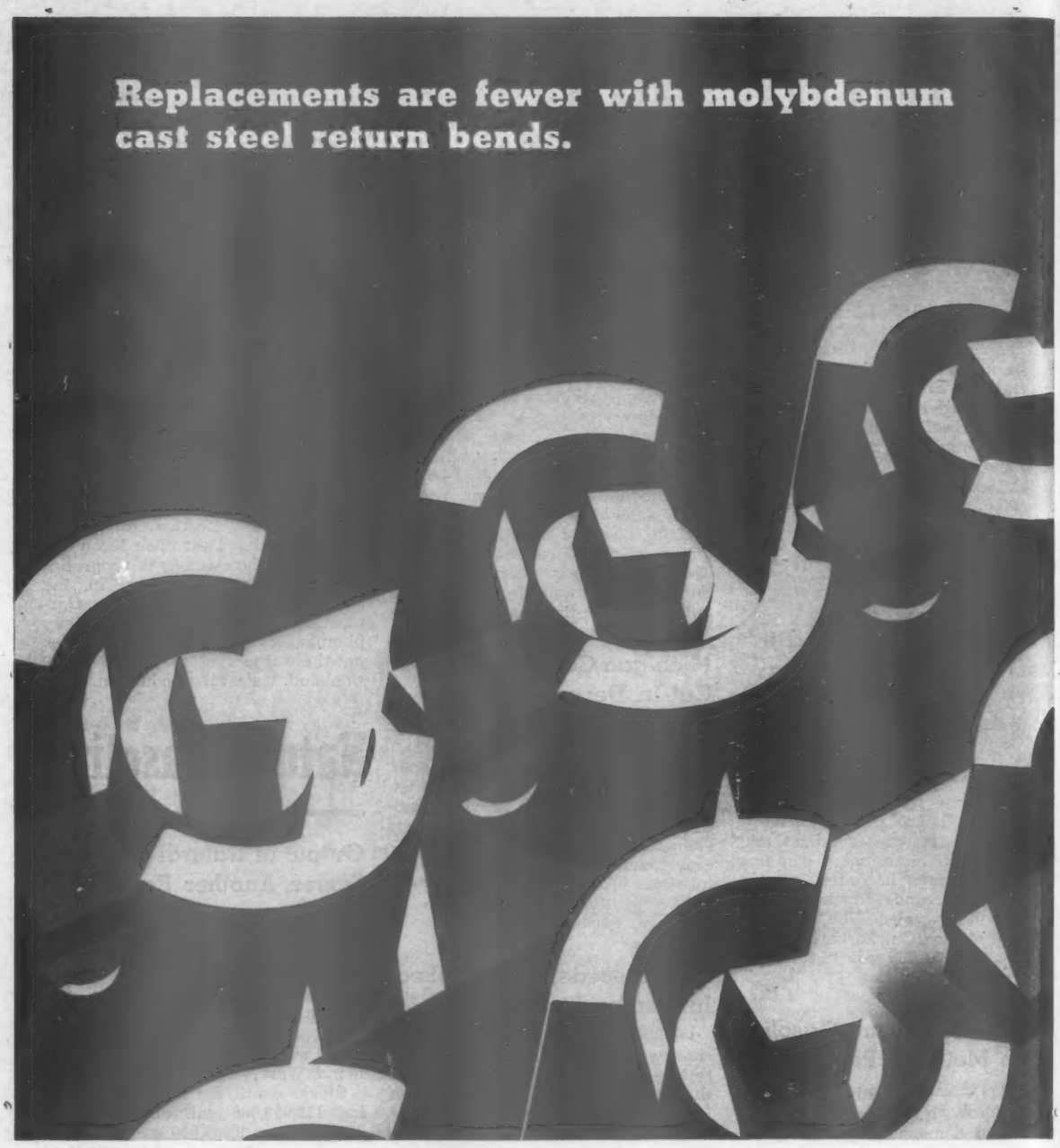
Stocks continued to decline, totaling 173,922,000 gal. on September 30. This was 2,940,000 gal. less than on August 31 and 24,444,000 less than on September 30, 1943. Daily average production of liquefied petroleum gases rose 10 per cent over August to a new high of 3,262,000 gal., resulting in an increase of 3,990,000 gal. in stocks, notwithstanding heavier demand.

PRODUCTION
(Thousands of gallons)

	Sept.	Aug.
Natural gasoline	186,438	191,940
Cycle products	70,518	76,944
Liquefied petroleum gases:		
Isobutane*	17,472	16,422
Other L.P.G.*	80,388	75,556
Liquefied refinery gas	15,708	14,028
Benzol	8,400	8,400
Total	378,924	383,292

*At natural-gasoline and cycle plants.

Replacements are fewer with molybdenum cast steel return bends.



CLIMAX FURNISPES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company

500 Fifth Avenue • New York City

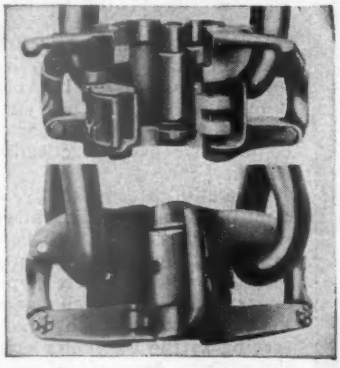
MOLY

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Kenneth E. Barnes

1 ELEVATOR FOR DRILL PIPE In addition to safety latch, this new Type AA elevator has cam and roller-spreading device that holds elevator open against the normal closing action of the links, thus removing the need to force elevator downward at an angle out of normal operating position in order to keep it open while being raised for another stand of pipe. Elevator arrives



at fourble board in level operating position. The usual impact of drill pipe of an easy quick pull frees the spreading cam and allows elevator to swing closed. Eliminates the need for derrick man to lean over and follow elevator for last few feet of travel to get it into operating position.

High alloy steel; top bore flame hardened; safety factor rated 4 to 1; 300 tons capacity. *Byron Jackson Co., Los Angeles, Calif.*

IT'S NEW CHECK IT

2 DETONATION INDICATOR Engineering Laboratories, Inc., have been licensed by Phillips Petroleum Co. for the production and sale of a detonation indicator, Model 102-A, which is used in determining knock point of aviation fuel.

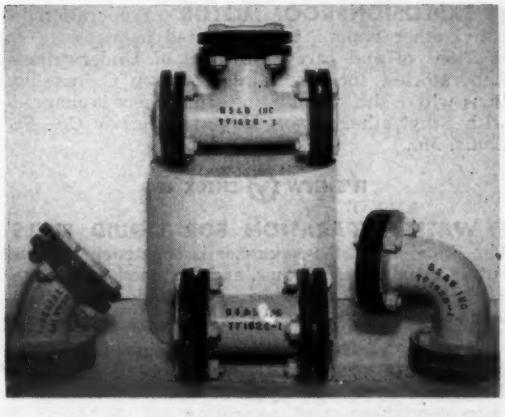
This meter was developed by Phillips in collaboration with the engineering staff of E. L. I., acting under authority of the Supercharged Methods Development Group of the Committee on Fuel Research. The instrument requires no alteration to the engine on installation, and is complete ready for immediate use.

The use of the detonation indicator, which at present is constructed to determine octane ratings of aviation gasoline, also has a wide application in engine manufacturing, both aviation and automobile, in determining power output of engines.

Refiners will thus be able to produce high-octane fuel held to close limits of octane specification. *Engineering Laboratories, Inc., Tulsa, Okla.*

IT'S NEW CHECK IT

3 SLIP-UNION FITTINGS which make threads or grooves unnecessary, are now in production by Black, Sivalls & Bryson. Each fitting is a union; connections need not be accurately lined as the slip-unions permit up to an 8° deviation from a straight line. Inexperienced field men can easily and quickly line them up, requiring only a small wrench to make up.



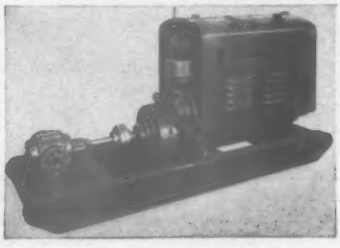
Made of heavy cast iron; may be used over and over again by replacing the molded gasket. Drilling on all fittings is Standard ASA 125 lb. Conversion from threaded to slip-union connections is possible as either the fitting itself or the loose flanges can be bolted directly to any flanged standard ASA 125-lb. fitting. *Black, Sivalls & Bryson, Oklahoma City, Okla.*

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

OIL AND GAS EQUIPMENT Digest — IT'S NEW CHECK IT

4 UNITIZED GATHERING PUMP has been designed for oil-field gathering service. Capacity, 50 g.p.m.; pressures to 500 p.s.i.; mechanical efficiency at 500 p.s.i., 70 per cent; suitable for suction pressures from 0 to 100 p.s.i.; will handle crude oils of viscosities from 40 S.S.U. to 200 S.S.U.; specific gravity, 0.82; power, 25 hp. gasoline engine, mounted on common fabricated steel skid with pump, reduction gearing and clutch.



A similar unit of 90-g.p.m. capacity is being designed.

Pump is equipped with special antifriction bearings. Stuffing box is designed to reduce leakage to absolute minimum by maintaining vacuum on the packing chamber. *Blackmer Pump Co., Grand Rapids, Mich.*

IT'S NEW CHECK IT

5 EXPLOSIONPROOF MOTOR for operation in Ethyl ether vapors, is constructed to meet specifications of and carry the label of Underwriters Laboratories, Inc., for Class I Group C installations where the surrounding atmosphere is charged with Ethyl ether vapor. *Century Electric Co., St. Louis, Mo.*

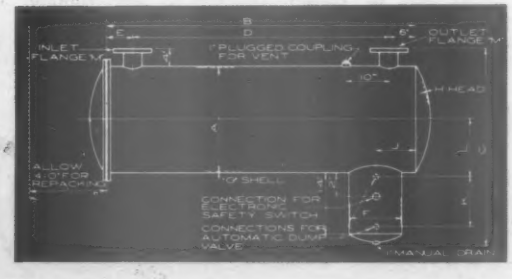
IT'S NEW CHECK IT

6 WATER SEPARATION FOR LIQUID FUELS The Excel-So water separator is constructed without external moving parts, and designed to remove 99.999 per cent of free or emulsified water from leaded or unleaded gasoline.

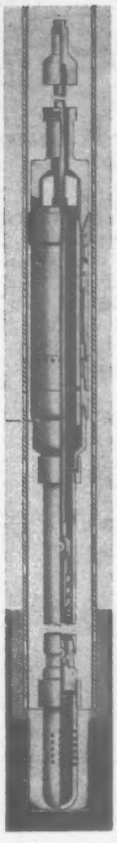
The high efficiency of separation is accomplished by a special coalescing and filtering medium, and by a new type of construction based upon new theories of separation.

In addition to water separation, the unit filters out silt, scale and other solids from the different fuels.

Standard units range in size from 25 to 1,000 g.p.m. in low or medium pressures. The 300-g.p.m. unit measures 7 ft. in over-all length and 24 in. in diameter, with 4-in. standard flanged inlet and outlet connections. *Warner Lewis Co., Tulsa, Okla.*



IT'S NEW CHECK IT



7 TUBING ELIMINATOR (casing pump), made in three models and in ranges that will accommodate all nominal pump sizes and that are adaptable from 4-in. i.d. to 9⅝-in. A.P.I. casing, is a recent addition to products of W. C. Norris, Manufacturer, Tulsa 1. This new piece of equipment does away with the necessity of the usual string of tubing in a pumping well.

The tubing eliminator, run with any conventional pump and the usual sucker-rod string, is all the subsurface equipment required in a pumping installation. The principal friction load in the fluid is minimized by utilizing the greater tubular diameter of the casing, rather than the smaller and more restrictive area inside tubing. Polished-rod load for this type pump is determined almost wholly by volumetric pump displacement per stroke, as physical friction resulting from wall-contact of rods is practically eliminated.

The eliminator assembly, with the built-in packer effecting a seal with the casing, is set at or below the producing fluid level. Either a liner, insert, or working-barrel-type pump operating in the usual manner lifts the production, with the casing serving as the conductor column to the surface. Any type of surface installation may be used for actuating the sucker-rod string.

In the photograph are shown the component parts of the conventional type eliminators in set position with pump installed in operating position. Perforated or mud anchor is installed at the lower end of the assembly. *W. C. Norris, Manufacturer, Tulsa, Okla.*

IT'S NEW CHECK IT

8 VENTURI-TYPE SAFETY VALVES are made with special provisions for constant accurate blow-off, exceptionally great capacity, complete tightness of reseating, minimum escape of vapor into surrounding space, and elimination of angular distortion and fouling.

The inlet venturi-tube nozzle gives a clear unobstructed port and guided high velocity of the steam, which results in high lift and corresponding great capacity. One of the features of these valves is the patented "separator bell." This device causes the steam to make three changes in direction before passing into the atmosphere, and includes a drain for the condensed moisture into the body. Escape of vapor into the air is thereby minimized. The "separator bell" also helps to keep the spring cool by preventing steam from striking it, and improves freedom and maintenance of alignment by providing for higher support of the spring.

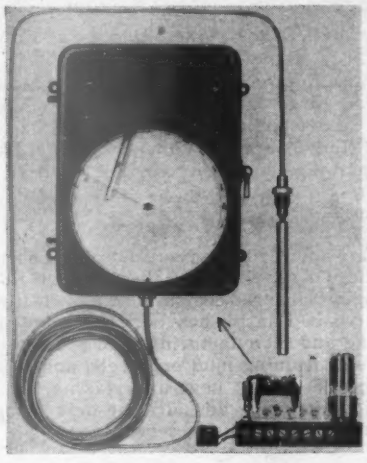
Correct alignment of the stem, on which com-

plete tightness of reseating depends, is further maintained by precision machine work throughout the valve, and by top guidance of the stem in two bearings. *The Farris Engineering Co., Palisades Park, N. J.*

IT'S NEW CHECK IT

⑨ **ELECTRONIC-TYPE CONTROLLER** employs the free-vane principle which operates on the shielding effect of a vane passing between two coils in an electronic circuit.

It is offered in recording and indicating models for controlling temperatures (125° to 1,000° F.), pressures (zero absolute to 6,000 p.s.i.), liquid-level



and humidity. Separate controls for wet and dry bulbs are a feature of the humidity controller. The controller is particularly suited as time-program controller or cycle timer. It may be used with motor or solenoid valves, relays, switches, and other control apparatus. *Bristol Co., Waterbury, Conn.*

IT'S NEW CHECK IT

TRADE LITERATURE

⑩ **V-BELT HANDBOOK**—seventy-four pages which covers every phase of the subject. Contains tables on installation, take-up allowances, V-belt lengths, service factors, general belt selection tables, etc. Folder is illustrated, tabbed for quick reference and pierced for use in loose-leaf notebook. *The B. F. Goodrich Co.*

IT'S NEW CHECK IT

⑪ **TILTING U-TUBE MECHANICAL METER** illustrated and described in eight-page folder. A high-torque mechanical meter having high accuracy over long life. *Cochrane Corp.*

IT'S NEW CHECK IT

⑫ **WELDING, BRAZING, SOLDERING FLUXES** announced in new catalog showing a line suitable for welding, brazing, soldering low-temperature alloy welding of ferrous and nonferrous metals and alloys. Detailed statement of characteristics given for each flux listed. Includes price list. *Superior Flux Co.*

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

⑬ **ELECTRIC BATTERY CONNECTOR** for oil-field pumping and drilling engines. Connector is designed to eliminate hand-cranking, batteries, and home-made connectors. Illustrated four-page folder shows in detail how connector works, gives installation advice and points out savings to be made in equipment. Designed for greater safety and faster well servicing. *Cannon Electrical Development Co.*

IT'S NEW CHECK IT

⑭ **STAINLESS STEEL WELDING ELECTRODES** discussed in a new informative book which gives detailed information on different types of electrodes. Also includes application recommendations, current range and sizes. Book divided into two sections with first section discussing the conditions encountered in welding stainless steels. *Page Steel and Wire Division of American Chain & Cable Co.*

IT'S NEW CHECK IT

⑮ **HYDRAULIC EQUIPMENT** for the process industries covered in an eight-page illustrated bulletin showing a comprehensive line of hydraulic presses, pumps, accumulators and forged steel fittings and valves. *Watson-Stillman Co.*

IT'S NEW CHECK IT

⑯ **HIGH-PRESSURE AUTOCLAVES** described in eight-page, illustrated, two-color bulletin. Complete line set forth with full data on each unit along with information on working pressures and different alloys from which units are fabricated. *Struthers Wells Corp.*

IT'S NEW CHECK IT

⑰ **BURIED PIPE AND CABLE FINDER** and leak detector covers operation of over a dozen methods for performing certain classes of maintenance, repair and construction work. Chiefly concerned with finding, locating and following buried pipe lines, pipe bends and dead ends, and detecting leaks. Well illustrated, with specific instructions for use under many different sets of circumstances. *Fisher Research Laboratory.*

IT'S NEW CHECK IT

⑱ **ACETYLENE GENERATORS** featured in two-color, illustrated folder describing a complete line of generators, but featuring a new portable model in which is incorporated an "air lift" water circulating system and enlarged radiation space which provides a cooler, double-scrubbed gas. *Air Reduction Sales Co.*

IT'S NEW CHECK IT

⑲ **INSTRUMENT CATALOG** lists all products made for regulating different plant processes. Contains 28 pages of information for industrial

men who encounter problems which must be solved through the use of measuring instruments and controls. Charts show instrument models. Heat-treating furnaces are also discussed with a page devoted to illustrating and describing each method. *Leeds & Northrup Co.*

IT'S NEW ✓ CHECK IT

20 FITTINGS, VALVES AND HOSE written up in a four-page folder suitable for a ring binder. All items illustrated and described in detail, with uses for gasoline storage tanks, fill pipes, tank-car unloading explained. *S. F. Bowser & Co., Inc.*

IT'S NEW ✓ CHECK IT

21 TRIPLE SLUSH PUMP described in eight-page folder. Contains installation drawing, cross-section and assembly drawing as well as pump-capacity chart. New features are pictured in closeup views to show compactness, portability, narrowness for road clearance, and increased power. *Clark Brothers Co., Inc.*

IT'S NEW ✓ CHECK IT

22 CONTAINERS FOR OIL, GAS, FUEL manufactured to specifications as set forth in this four-page bulletin listing equipment for the petroleum industry. Tanks, drums, barrels, cylinders and containers made from stainless steel, aluminum, copper-brass, magnesium. Bulletin describes engineering service in connection with manufacture of fuel containers. *Benson Manufacturing Co.*

IT'S NEW ✓ CHECK IT

23 SAFETY CATHEADS written up and well illustrated in 12-page brochure. Lists advantages and gives installation instructions as well as parts diagram and price list. Increased efficiency and ease of installation stressed. *Ben F. Kelley Co.*

IT'S NEW ✓ CHECK IT

24 CASING HEAD bulletin features head for use on single strings in wells of medium depths and pressures where an independent tubing head is used to support the tubing. Wide range of sizes. Application of head easy and safe. *National Supply Co.*

IT'S NEW ✓ CHECK IT

25 ARC WELDING ELECTRODES bulletin gives complete description of each electrode in line. Includes charts on physical properties of weld metal for each electrode and recommended current values. Electrodes are both a-c and d-c types, identified by AWS classification numbers. *Allis-Chalmers Manufacturing Co.*

INDUSTRIAL ITEMS

Devenco, Inc., 150 Broadway, New York City, announces acquisition of additional engineering facilities at 73 Warren Street, in order to meet its expanding requirements. This organization offers clients such specific services as product development and design, market research, tool design, processing for manufacture, plant layout, and reconversion.

Briggs Clarifier Co. announces two new distributors: M. N. Dannenbaum Co., Houston, for the East Texas and Gulf Coast area, and McGregor & Werner, Inc., Washington, D. C., for the states of Maryland, Delaware and District of Columbia.

Mixing Equipment Co., Inc., Rochester, has appointed Emerson Scheuring Tank & Manufacturing Co. of Indianapolis as representative for Central Indiana, and White Industrial Sales & Equipment Co. of Cincinnati, for southern Ohio, northern Kentucky and western part of West Virginia.

R. E. Dansby, for 9 years mud engineer with Stanolind Oil & Gas Co., has started his own mud-engineering service in Houston. During the past 12 years Dansby has been actively engaged in mining and manufacturing mud products, servicing wells, training mud engineers, and doing research work. In his new undertaking, he offers consulting service, plus drilling-mud programs, and complete laboratory service.

Pennsylvania Salt Manufacturing Co. recently dedicated its new Whitemarsh Research Laboratory, Whitemarsh, Pa.

Stacey Brothers Gas Construction Co., Cincinnati, was recently honored with a renewal of the Army-Navy "E" award, and the addition of one star to their flag.

The Rucker-Vaughn Co. has been formed through consolidation of Vaughn-G. E. Witt Co., and Rucker Equipment Co. Headquarters are at 300 Seventeenth Street, Oakland, Calif. The company manufactures a complete line of standard pressure valves, steam and air atomizing oil burners, and is sales agents for a representative group of compressed-air and production tools.

Fisher Governor Co. announces appointment of Malcolm W. Black & Co. as its representative in metropolitan New York.

Burndy Engineering Co., New York City, announces a complete new line of aluminum connectors for all power needs, available in a full range of sizes and types for all aluminum-to-aluminum connections, as well as aluminum to copper.

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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TO WEATHER POST WAR *UNCERTAINTY*

Naturally you want to establish yourself quickly and permanently in the post war era. To help you, Blaw-Knox offers engineering and products of wide range. It also has the facilities and personnel to manufacture for you, all or parts of your products.

One of the most important activities at Blaw-Knox is the Process Equipment Department, which among other things, specializes in the design and manufacture of equipment for the carrying out of chemical reactions by both the batch and continuous processes. This department is fully qualified to render a complete service from building pilot plants to equipment for full scale production.

Blaw-Knox leadership in the origination and fabrication of products for so many fields of industry is a ground for confidence that it can be of help to you if your business comes within the scope of its activities. Many Blaw-Knox products now of international reputation were originated to fill the needs of one manufacturet. Perhaps the Blaw-Knox umbrella of industrial coverage can include worth while services to you. May we talk it over?

A chemical plant designed, fabricated and erected by Blaw-Knox for large midwest manufacturer.

BLAW-KNOX COMPANY

A PACEMAKER FOR AMERICAN INITIATIVE AND INGENUITY

FARMERS BANK BLDG., PITTSBURGH, PA.

Buy More War Bonds and Stamps

LEWIS FOUNDRY & MACHINE DIVISION, Rolls and Rolling Mill Machinery

NATIONAL ALLOY STEEL DIVISION, Heat and Corrosion-Resistant Alloy Castings

SPECIAL ORDNANCE DIVISION, Bofors Anti-Aircraft Gun Mounts and Mechanisms

PITTSBURGH ROLLS DIVISION, Rolls for Steel and Non-Ferrous Rolling Mills

POWER PIPING DIVISION, Prefabricated Piping Systems

BLAW-KNOX DIVISION, Chemical & Process Plants & Equipment, Construction Equipment, Steel Plant Equipment, Radio & Transmission Towers . . . General Industrial Products

COLUMBUS DIVISION, Ordnance Matériel

UNION STEEL CASTINGS DIVISION, Steel and Alloy Castings

MARTINS FERRY DIVISION, Bofors Anti-Aircraft Gun Mounts

BLAW-KNOX SPRINKLER DIVISION, Automatic Sprinklers and Deluge Systems

Five Blaw-Knox Plants have been awarded the Army-Navy "E" for war-production excellence

A FEW VICTORY PRODUCTS

ANTI-AIRCRAFT GUN MOUNTS · GUN SLIDES · LANDING BARGES · AERIAL BOMBS · POWDER PLANTS · PIPING FOR NAVAL VESSELS · SYNTHETIC RUBBER PLANTS · CAST ARMOR FOR TANKS & NAVAL CONSTRUCTION · CHEMICAL PLANTS

Goulds

the PUMP FOR the JOB

Whatever your pumping job may be, whatever you may be planning in the way of replacement, expansion or new developments in pipe lines or refineries, where liquid handling is the problem, specify Goulds.

Specializing in pump building only, for 96 years gives Goulds the engineering knowledge and skill plus a complete line of centrifugal, rotary and reciprocating pumps that permits selection of the right size and type to provide "*the* pump for *the* job."

Goulds PUMPS INC.
SENECA FALLS, N. Y.

Successful oil men all agree—

. . . that highest quality in oil field equipment and supplies is absolutely essential for efficient operation.

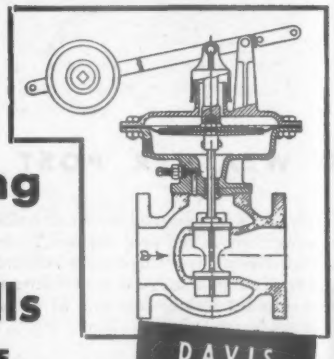
For a quarter of a century, Lucey Products Corporation has been serving these successful oil men — with products which more than meet their exacting qualifications.

LUCEY PRODUCTS CORPORATION
OIL WELL SUPPLIES
TULSA, OKLAHOMA

For

Controlling Gases from Wells

BACK PRESSURE VALVE



DAVIS NO. 330W

An unbeatable combination of features is built into Davis No. 330W Weight Loaded Gas Back Pressure Valves. The valves are unexcelled for maintaining pressure or vacuum on wells, gathering lines, or separators in gas gathering systems. Shifting the position of the lever changes the valve from a Vacuum Regulator to a Back Pressure Valve.

Utmost in Sensitivity is assured by large diaphragm area, and constant loading throughout the inner valve travel.

There is no packing box.

Exclusive Rain Cap protects diaphragm from the elements.

The above features insure *sensitive, efficient, economical, trouble-free* service.

Write for bulletin G-1.

DAVIS REGULATOR COMPANY
2542 SOUTH WASHTENAW AVE., CHICAGO

REFINING

Isobutane Yields High in Champlin Aviation Plant

ENID.—More than 200 gal. of isobutane has been made per pound of aluminum chloride catalyst consumed in the Champlin Refining Co.'s isomerization plant here, according to statement by E. J. Slater, Champlin vice president, in charge of refining operations. With an operation-time factor of higher than 90 per cent, and no shutdowns attributable to corrosion troubles, this plant has been operating more than 6 months, practically continuously.

Inspection of the plant in October showed no appreciable indications of corrosion, and the slight evidences found are attributed to conditions obtaining early in its operation, Slater said. These conditions were corrected without delay. The plant shows conversion of normal to isobutane of 500 gal. per pound of hydrochloric acid consumed; the acid is part of the combined catalyst used in the process. The charge stock is dried rigorously by regenerative bauxite driers, which are supervised carefully to maintain efficiency. Caustic soda is also used as a neutralizer in the process, at one stage, and 6,000 gal. of isobutane are made for each pound of caustic used.

Phillips Petroleum Co. licensed this process to Champlin, and supplied early operating assistance. It was designed by Koch Engineering Co. of Wichita, Kans., and built by the Champlin company. The company has been able to produce enough isobutane for its own operations and to sell considerable amounts to outside companies as well, the announcement states.

Duncan Plant to Be Kept Operating, Says PAW

WASHINGTON. — The 100-octane plant of Associated Refineries, Inc., at Duncan, Okla., will not shut down, nor will its production schedule be reduced, before the end of the Japanese war, according to Petroleum Administration for War, following receipt of a telegram from M. L. Freese, president of the company, saying employes were quitting in the belief that the refinery might be sold, closed or shifted to other production.

The erroneous impression apparently arose from the refinery being listed recently by Defense Plants Corp. as one it owns and which eventually will be offered for sale. Although the announcement said most of the plants, and particularly those engaged in production of aviation gasoline, would not be declared surplus until well after the total war is over, workers seemingly believed their jobs were in danger.

"We shall need every drop of 100-octane gasoline we can get until the Jap war is over," a PAW spokesman declared. "Even after that, it is possible the Duncan plant will continue in full operation."

Meanwhile, PAW Manpower Director George Dewey said that his office would make every effort to engage workers to fill vacancies at the Duncan refinery.

Humble Produces Billionth Gallon of Aviation Fuel

HOUSTON.—Humble Oil & Refining Co. will process the billionth gallon of 100-octane aviation gasoline at its Baytown plant on December 14, and this record-marking gallon is to be presented to a high military official at a celebration at the plant on that day, H. C. Wiess, president, announces. Company offi-

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LELAND HAMNER CO.

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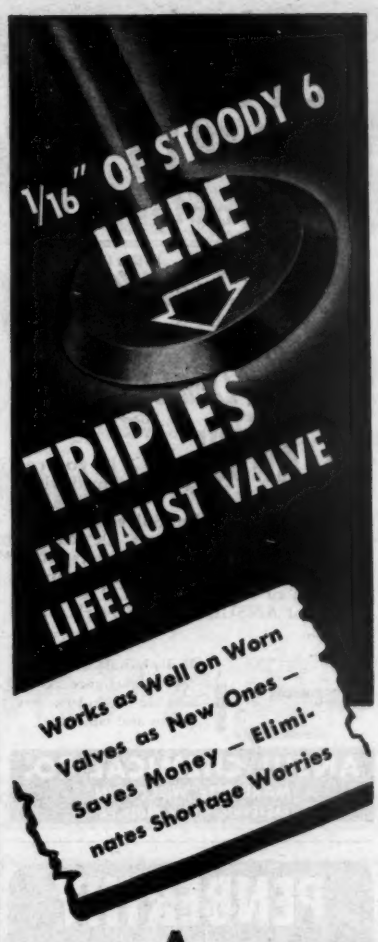

1/16" OF STOODY 6
HERE
TRIPLES
EXHAUST VALVE
LIFE!
Works as Well on Worn Valves as New Ones — Saves Money — Eliminates Shortage Worries

AN ounce or two of Stoody 6 welded to new or worn exhaust valve faces adds 300 to 400 percent to their normal life, prevents burning, saves overhaul jobs, costs only a few cents per valve.

This folder outlines the simple procedure any garage or shop equipped with acetylene welding equipment can follow. Eliminates your worries about valve replacements and saves money as well.

Write for folder "Weld New Life Onto Worn Valves With Stoody 6" — no obligation.

STOODY COMPANY

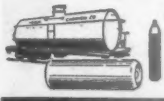
1138 SLAUSON AVE., WHITTIER, CALIF.

STOODY 6 - THE METAL THAT ADDS EXTRA MILES TO EXHAUST VALVE LIFE!

For that
PETROLEUM CHEMISTRY
Problem!

LIQUID Methyl Chloride* by ANSUL
LIQUID Sulfur Dioxide* by ANSUL

If you're faced with problems concerning Catalyst Solvents, Refining Agents, Extractants, Dewaxing Agents or Reaction Solvents, the answer may lie in the correct application of ANSUL SULFUR DIOXIDE or ANSUL METHYL CHLORIDE.
*REG. U.S. PAT. OFF.



Easily handled. 99.9+% (by weight) pure. Available in cylinders, ton drums and tank cars.

ANSUL CHEMICAL CO.
MARINETTE, WISCONSIN
EASTERN OFFICE • PHILADELPHIA

PENBERTHY
"REFLEX"
DROP FORGED STEEL
LIQUID LEVEL GAGES

Liquid always shows black—empty space shows white. Preferred where the liquid level must be easily and positively visible, and when liquids are under high pressure or at high temperature. Made of alloy temperature resisting steel and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

cials say the Baytown refinery will be the first one in the country to hit the billion-gallon mark.

A bronze medal commemorating the achievement will be presented to the company's 14,000 active employes, and more than 3,000 now in the armed forces will be sent a book containing a message from the management.

Baytown Ordnance Works, the first plant in the nation to manufacture toluene from petroleum by chemical synthesis, has supplied the toluene for at least one out of every two bombs used by the United Nations since Pearl Harbor. For this achievement it has been awarded the Army-Navy "E" five times.

Humble is credited with handling over 4 per cent of the total crude oil refined in this country. It is processing currently over 200,000 bbl. daily, or 73,000,000 bbl. a year. The Baytown butadiene plant, a government-built $19,400,000 project, has a rated capacity of 30,000 tons a year.

WPB Puts Sulfuric Acid Under Allocation

WASHINGTON. — Sulfuric acid has been placed under allocation by War Production Board. The order, subject to the terms of Schedule 74 of General Allocation Order M-300 (chemicals and allied products), became effective December 1. Simultaneously, WPB revoked Preference Order M-257 (sulfuric acid) also effective December 1, except as to use and delivery during December 1944 by suppliers in Washington, Oregon, California, Arizona, New Mexico, Nevada, Utah, Colorado, Wyoming, Idaho and Montana. Customers may order sulfuric acid from these suppliers for delivery during December and may use the acid delivered on these orders without filing the certificates otherwise required by Schedule 74.

Schedule 74 provides that persons placing orders with suppliers in other states for delivery of 500 tons per month from all suppliers must furnish each supplier with a certified statement of proposed use. The schedule also provides that any person who has received sulfuric acid for a particular use may, without application or specific authorization, use the residual acid for any other purpose, except for superphosphate production, if it is no longer suitable for the original purpose.

Sun's Thermofor Catalytic-Cracking Plant on Stream

PHILADELPHIA.—Sun Oil Co.'s two-unit Thermofor catalytic-cracking plant at its Marcus Hook, Pa., refinery is now in operation, marking completion of the company's $29,500,000 construction-for-war program. The new plant, J. Howard Pew, president, announced, is producing high-octane aviation gasoline for the armed forces. The new units have a combined daily charging capacity of 20,000 bbl.—840,000 gal.—and are integrated with other units to increase still further Sun's production of gasoline for aviation use.

The units, like other facilities Sun has built to maximize production of war products, were financed entirely by the company. The cost was approximately $4,000,000, exclusive of existing facilities.

Construction of the new units required nearly 50 miles of pipes and tubes, ranging in size from a fraction of an inch to 42 in. in diameter; 3,720,000 lb. of steel in the structure and an additional 1,940,000 lb. in equipment; 2,825 valves; 2,700 flanges; and $125,000 worth of instruments. In operation, the units circulate 990,000 gal. of water and 200 tons of catalyst every hour, 24 hours a day.

The units, tall as a 20-story building, were built largely by Sun Oil's own refinery construction department with the assistance of E. B. Badger & Sons Co., Boston. Houdry Process Corp. is the licensor.

OIL and GAS BURNING EQUIPMENT
NATIONAL AIROIL BURNERS
1236 E. Sedgley Ave.
PHILADELPHIA 34, PENNA.

GUNITE METHOD
SAND AND CEMENT
"Placed by Air"
WRITE — PHONE — WIRE
FOR SERVICE — INFORMATION
GUNITE CONCRETE & CONSTRUCTION COMPANY
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John Zink Makes

OIL BURNERS THAT WORK

We have developed an Oil Burner that not only produces a short, bright sharp edge flame — but also gives direction.

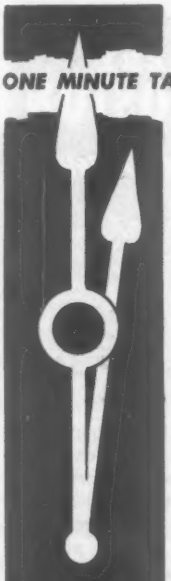
Write for Literature

JOHN ZINK COMPANY

Tulsa, Oklahoma

NEW YORK . . . LOS ANGELES . . . DETROIT . . . SAN FRANCISCO . . . ST. LOUIS

ONE MINUTE TALKS ON



Low-Cost Way to Clean Heat Exchangers

When your heat exchangers are not operating at peak efficiency one unsuspected cause may be the presence of carbonized oil, sludge, lime scale or rust. The insulating properties of these foreign deposits impair proper heat transfer . . . prevent effective unit operation.

But you can quickly restore equipment to normal efficiency by circulating through system, or permitting to soak, a recommended solution of specialized Oakite desludging or de-scaling material. The result will be an immediate increase in operating efficiency at lower operating costs. Further details FREE on request! Write TODAY!

OAKITE PRODUCTS, INC.
44C Thames Street, New York 6, N. Y.

Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* **CLEANING**
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

WANTED

We are in the market for Natural Gasoline, Propane, Butane and Distillates. Give Quantities, Price, and Shipping Point.

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WOOD RIVER OIL & REFINING CO.

335 W. LEWIS **L. D. PHONE NO. 232**
WICHITA, KANSAS

Tube Borium Keeps 'em digging

DULL IN 3 DAYS
STILL SHARP AFTER 30 DAYS
STOODY TUBE BORIUM* KEEPS DITCHER TEETH SHARP ...ELIMINATES FREQUENT SHUT-DOWNS FOR TOOTH CHANGES...CUTS REPLACEMENT COSTS UP TO 75%

The two ditcher teeth pictured above were used on the same machine and operated under identical conditions.
The unprotected tooth at the top had to be sharpened every three days and was too short for further service after six sharpenings.
But the Borium-protected tooth at the bottom operated for 40 days and wore only ½". It was simply resharpened in the forge, retipped with Tube Borium, and put back on the ditcher for another 40 days' service.
Before the tooth was finally worn out, it had operated a total of 120 days!
Tube Borium makes such savings possible because the deposits represent the ultimate in wear resistance and the ability to cut hard earth formations.

*Stoody Tube Borium is supplied in rods of 1/8", 3/16", 1/4" and 3/8" diameters and is available for either oxyacetylene or D.C. electric application. Prices and specifications are yours for the asking.

These tungsten carbide particles do not melt when tube is applied but are held in suspension in a mild steel matrix forming a deposit resembling coarse sandpaper.

Send for free booklet on TUBE BORIUM, showing sizes and styles of rods and recommended methods of application.

STOODY COMPANY
1138 West Slauson Ave., Whittier, Calif.

STOODY HARD-FACING ALLOYS
Stop wear... Eliminate Repair

PIPE LINES

Stanolind Completes Casper-Welch Line

The new 31-mile 12-in. line for shortening the distance for pumping crude oil from Casper to the Welch station, Wyoming, has been recently completed and tested with air pressure. It is being put in service this week.

Oil is being received by intermittent pumping at Casper from the Elk City basin through Stanolind's 232-mile 12-in. line. Preparations have been completed for operating the Kirby pump station on the line.

United Natural to Lay 37½-Mile Gas Line

Federal Power Commission has authorized the United Natural Gas Co. of Oil City, Pa., to construct and operate a 37½-mile 12¾-in. pipe line and to operate an 18.2-mile 12¾-in. pipe line which has already been constructed. These pipe lines are required in order that the United Natural Gas Co. may receive, transmit, and distribute 3,160,000,000 cu. ft. of natural gas which FPC has authorized it to buy annually from Manufacturers Light & Heat Co. of Pittsburgh.

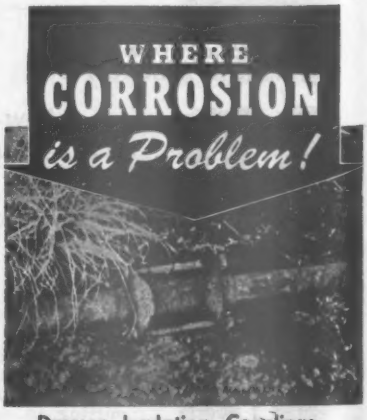
The new pipe line, which the commission's order specifies must be completed by December 31, 1944, will begin at United's Ellwood compressing station in Beaver County, Pennsylvania, where gas will be delivered by Manufacturers Light & Heat, and will extend to United's Mineral station in Venango County, Pennsylvania. The 18.2-mile pipe line already constructed connects two of the company's compressing stations in Venango County. These facilities which were constructed for use within Pennsylvania will not be operated in interstate commerce.

Under the terms of a contract entered into on January 14, 1944, United is to purchase, for a period of 10 years, 3,160,000,000 cu. ft. of natural gas annually from Manufacturers Light & Heat Co. Delivery of this gas is to be begun as soon as the latter company receives gas from the pipe line which the Tennessee Gas & Transmission Co. has recently constructed.

No change in rates is contemplated by United as a result of the construction of the additional facilities. The company will finance the facilities from its own corporate funds and will operate them as an integral part of the existing system. This system consists principally of interconnected pipe lines and appurtenant facilities in Pennsylvania used for the transportation and sale of natural gas in interstate commerce.

Texas-New Mexico Plans For 30-Mile Looping

A program for laying 30 miles of 12-in. loops has been planned by Texas-New Mexico Pipe Line Co. for which federal authorization has been granted. The loops will be laid to increase the capacity of the company's system at points between Crane and Houston. The project is scheduled for completion in February 1945.



Dresser Insulating Couplings break the flow of current between pipe lengths, prevent hot spots and electrolytic corrosion on the gathering line shown in the above photo.

Complete stock of "Dressers" ready at Dresser Houston Warehouse. Contact your distributor

PHONE: CHARTER 4-4723; L.D. 2107

DRESSER
HOUSTON WAREHOUSE
1121 Rothwell St. Sec. 16, Houston, Texas

Robinson-Indianapolis Line Construction Is Advanced

Most of the pipe for Ohio Oil Co.'s 115-mile 8-in. refined products line has been laid between Robinson, Ill., and Indianapolis, Ind., which is due to be completed this month. The contractor, Sheehan Pipe Line Construction Co., has two spreads on the job. Construction of the pump station at Robinson is reported to be well advanced.

Texas-Empire Is Completing Missouri River Crossing

Texas-Empire Pipe Line Co. is completing work at the Missouri River crossing contracted by George C. Bolz Dredging Co. During a flood period earlier this year, there was a break in the main 12-in. line at the crossing as the result of vibration when material in which pipe was buried, in the river bed, was washed away. A survey showed that the course of the river had shifted. A new 12-in. line was laid across the river. An auxiliary 12-in. line, which had continued in service although suspended due to washing away of the river bed, was lowered and buried. The broken main line was removed, repaired and placed again in the river. All three of these river crossing lines have been buried to depths specified by War Department regulations.

Work is now under way for laying an auxiliary 12-in. line to parallel the 12-in. river crossing line of Texas-Empire at the Arkansas River near Sand Springs, Okla., which has been contracted by Anderson Brothers.

Pipe Laying Progresses for Colonial Beacon Project

For the building of Colonial Beacon Oil Co.'s products line, pipe is being laid at a rate to meet the schedule for completion in January. The project consists of 35 miles of 4-in. and 6-in. from Everett to Methuen, Mass.

Monterrey, Mex., Line Problems Are Studied

Pending the authorization of construction by United States and Texas governmental agencies, pipeline construction contractors have been studying problems connected with the proposed project of Reynosa Pipe Line Co. for laying a 140-mile 14-in. natural gas pipe line from Hidalgo County, Texas, to Monterrey, Mexico. Cost estimates have been prepared and various matters have been under discussion such as provisions for obtaining permission for return of equipment to the United States after completion of the work as well as arrangements regarding the currency in which payments for the undertaking will be made.

Humble Will Serve Midland Farms Pool

Humble Pipe Line Co. has undertaken to provide an outlet for the new Midland Farms pool, in southern Andrews County, West Texas, recently opened by Stanolind Oil & Gas Co. A 4-in. line will be laid to connect with Humble's 6-in. Means-North Cowden lateral line.

Ontario Seeks Gas Imports

TORONTO.—The possibility is being considered of supplementing declining natural-gas supplies in western Ontario with imports from the Texas fields. The Texas product is now being delivered to Detroit, and the Union Gas Co. system now extends to Windsor, on the opposite side of the Detroit River. Officials of the Union Gas Co., however, state that no arrangements for a connection with the Detroit terminal have been made.

C. S. FOREMAN COMPANY

General Contractors

PIPE LINES

20 West Ninth Street
Kansas City, Missouri

SYNCHRO-START

HAVE YOU A MANPOWER PROBLEM?
Automatically Controlled Internal Combustion Engines in the field and at pumping and booster stations will lick a lot of your problems, including that of manpower. Ask your Engine Manufacturer or write us for complete information.

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221 E. CULLERTON ST., CHICAGO, 16, ILL.

AUTOMATIC ENGINE CONTROLS

"CLEVELANDS"

FIT EXACTLY INTO YOUR REQUIREMENTS for MAIN and FIELD LINE DITCHING or for STRIPPING PIPE

No matter where you put them, sticky mud, rocky or sandy ground or rough terrain, "CLEVELANDS" deliver Top Performance.

THE CLEVELAND TRENCHER COMPANY
"Pioneer of the Small Trencher"
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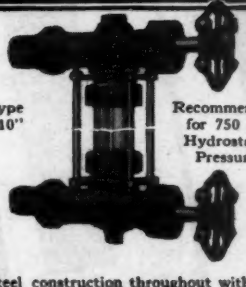
PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



Type "10"

Recommended for 750 lb. Hydrostatic Pressure

Steel construction throughout with stainless steel interior trim. Automatic shut-off is positive and instantaneous; stainless steel balls shut off the flow of liquid when glass breaks. Heavy duty stuffing boxes, union connections, offset construction facilitate cleaning and simplify glass replacement. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Whistle...

That's what your casing will be as clean as when you use the Baker Rotary CASING Scraper when you are drilling out cement. What Alka Seltzer is to a morning after this tool is to casing with hardened cement sheaths, burrs from gun-shot holes, scale and stuff. It cleans them out as slick as. It's the simplest, most logical tool you ever saw—just turn to Page 357 in the Composite Catalog and take a look at it. Or write us for an autographed picture.

(The right address for you to call will be found on Page 302.)

BAKER
ROTARY CASING SCRAPER
BAKER OIL TOOLS, INC.

Have YOU turned to Page 357 of the Composite Catalog?

BAKER OIL TOOLS, INC. 357

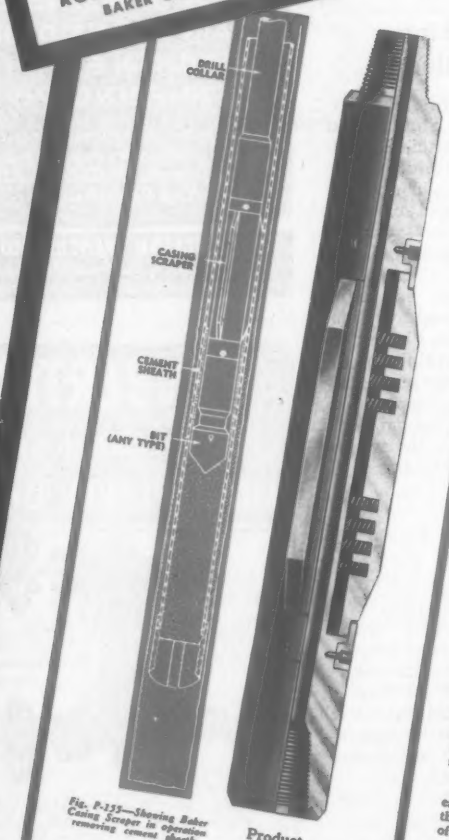


Fig. P-155—Showing Baker Casing Scraper in operation removing cement sheath.

Product No. 620

Fig. P-156—Baker Rotary Casing Scraper.

BAKER

BAKER ROTARY CASING SCRAPER

(Product No. 620)

USE: For scraping and cleaning the inside walls of casing. Following a cementing job, it can be used to remove the sheath or thin wall of hardened cement which usually adheres to the inside walls of the casing even after a maximum gage bit has been used to drill out the cement or tailings left in the lower end of a cemented string of casing. It is also adaptable for the removal of burrs and scale and of most any type of substance or material (such as paraffin, etc.) deposited or adhering to the inside of the casing walls. Other specific uses for a tool of this type will readily suggest themselves to progressive operators.

ADVANTAGES: Tool is amply strong and can be run with absolute safety; it is simple in construction; has few working parts; is easy to operate; blades are self-adjusting; provides smooth, clean scraping action; can be run behind the bit for simultaneous drilling and scraping inside the casing; affords low-cost method of cleaning substances from inside of casing walls.

CONSTRUCTION: the Baker Rotary Scraper has relatively few parts, consisting principally of a body, in which three long, reamer-type hard-faced blades are vertically mounted, the blades being held in place in the body by a set of (six) Blade Retaining Segments. These three blades form an expansible reamer, due to the fact that they are at all times pressed outwardly against the casing walls by a number of strong, coil springs. This self-adjusting and equalizing construction contributes much to the satisfactory operation of the tool, affording uniform contact with the walls of the casing and giving a smooth, clean scraping action.

As will be noted from Fig. P-156, each Casing Scraper Blade is designed with 8 spring recesses and 8 springs for each blade. The full number of 8 springs has proven advantageous in some operations, particularly in reaming out the ring of cement left in collars and shoes after drilling out following a cementing job. For light scraping work, such as removing soft materials, including paraffine, mud sheaths, etc., that may have formed on the inside of the casing, it is unnecessary that the blades exert their maximum pressure against the casing walls. In such applications, two or four springs under each Blade will probably be adequate. The proper number of springs to be used, however, is optional, and the best practice to be followed will have to be determined by actual field experience.

When it is desired to remove unneeded springs, this can easily be accomplished by unscrewing the cap screws holding the Blade Retaining Segments, which will permit removal of the blades.

OPERATION: In operation (see Fig. P-155), the tool is inserted in the drilling string between the drilling bit and the drill collar. It is provided with a tool joint pin on the upper end, and a similar box on the lower end. Since the springs press the blades outwardly at all times, the Casing Scraper is run in the hole with the blades riding against the inside walls of the casing. A Baker Junk Basket (see page 339) is frequently run above the Casing Scraper to aid in removal of material scraped off.

BAKER OIL TOOLS, INC.

Exploration and Drilling

Week's Highlights

AS the year draws to a close with indications that approximately 4,000 wildcats will be completed in 1944, signs of the strain of that effort are evident.

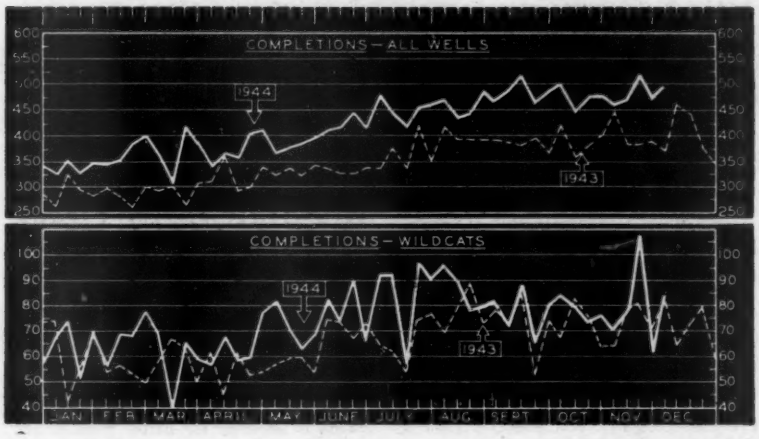
Material shortages have been well publicized many times, and for a time last spring, draft demands for younger men caused attention to be given the shortages of manpower among the geologists and geophysicists.

Except for the flurry in the spring, little has been said publicly about the manpower problem among the geologists and geophysicists. Yet it requires only casual observation to recognize signs everywhere of the effect on exploration personnel of selecting the locations and watching the results of 4,000 wildcat tests in 1 year.

Many people fail to realize that the geological departments must keep a balance between the untested acreage and that being tested. Just as there must be a balance between drilling and production; between production and refining, etc., so also there must be a balance between the amount of acreage in process of being tested and the amount of acreage under lease, and still another balance between the total acreage under lease and the amount of work that should be done to check and examine the geology of areas where future leasing is contemplated.

The net result is added strain all along the line in the exploration branch. The key men worry about the quality of acreage they are acquiring for future testing. Much of it is taken on the basis of geophysical work, and the essence of good geophysical work is skilled interpretation of accurate instrument recordings. Yet the standards of education and skill among geophysical field parties is at an all-time low with the experienced men strained to the utmost to avoid "busts".

The key men worry because war pressure forces testing of blocks where more time could well be spent in checking and interpreting all the geological and geophysical data at hand before recommending a test. Then when such a test is drilled it should be watched even more closely than an ordinary wildcat as the drilling progresses, but there just isn't enough manpower to do the job.



Solid line charts current weekly completions, service wells in Eastern area not included

COMPLETIONS IN ALL FIELDS . . .

Week ended December 2, 1944

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.	62	18	*64	*144	196,005	†5,806	3,203
Ohio	4	8	5	17	50,185	936	868
Indiana	2	0	4	6	12,393	238	204
Kentucky	8	23	9	40	102,801	714	435
Illinois	31	0	16	47	121,106	1,803	1,641
Michigan	4	2	7	13	27,865	629	591
Kansas	15	1	22	38	129,133	1,711	1,586
Nebraska, Missouri, Iowa	0	0	0	0	0	35	44
Oklahoma	23	2	12	37	189,570	1,703	1,108
Texas:							
North Central	14	2	22	38	95,239	1,374	1,382
West	31	1	3	35	170,906	1,472	858
Panhandle	8	3	2	13	39,869	277	173
Eastern	1	2	4	7	49,807	297	282
Gulf Coast	11	5	10	26	176,129	1,169	440
Southwest	2	1	4	7	32,434	625	852
Total Texas	67	14	45	126	564,384	5,214	3,987
Louisiana:							
Northern	2	1	3	6	37,585	302	309
Southern	8	1	2	11	109,108	448	333
Total Louisiana	10	2	5	17	146,693	750	642
Arkansas	0	0	0	0	0	197	252
Mississippi	8	0	1	9	51,369	145	95
Southeastern States	1	0	2	3	15,298	49	‡
Montana	1	1	4	6	12,994	325	220
Wyoming	4	0	2	6	25,244	164	126
Colorado-Utah	0	0	1	1	9,084	32	23
New Mexico	5	0	3	8	23,991	368	215
California	32	3	4	39	147,762	1,846	1,267
Total United States	277	74	206	557	1,824,887	22,665	16,487
Total previous week	278	67	181	526			
Total Dec. 4, 1943	213	49	106	368			

*Includes 59 pressure wells. †Includes service wells in Appalachian area. ‡Included in total shown for Mississippi.

TEXAS GULF COAST

Wharton Discovery Waiting on Storage

HOUSTON.—General Crude Oil Co. 2 Security Bank & Trust Co., discovery well 4 miles southwest of Lane City, in Wharton County, is shut in waiting on storage after testing in perforations at 5,345-50 ft., flowing approximately 5 bbl. of 26.1-gravity oil an hour on ½-in. choke.

Sun Oil Co. 1 Merchant estate, new sand discovery 3 miles west of Sour Lake on the west flank of Sour Lake dome, Hardin County, flowed 132 bbl. daily on Railroad Commission potential gage through ¼-in. choke, with gas-oil ratio of 735 to 1 and pressures of 150 lb. on tubing and 250 lb. on casing. Gravity was 29.3° with no water showing. Completion is through 176 perforations from 6,335-65 ft. Total depth is 6,590 ft. with 5½-in. casing set on bottom and 2⅜-in. tubing at 6,318 ft. Location for Sun 2 Merchant has been made on same lease.

Tide Water Associated Oil Co. 1 D. L. Underwood, discovery well in M. Muldoon Survey 30, 3 miles northwest of Sheridan in Colorado County, is still testing. Last gage reported showed the well flowing at rate of 146 bbl. daily, based on 16-hour test, through ⅛-in. choke, 3 per cent cut. 41 gravity oil, with tubing pressure 2,700 lb. Total depth is 9,990 ft. with 7-in. set at 9,962 ft.

Magnolia Petroleum Co. and Abercrombie 1 E. W. Helmuth et al in Old Ocean field of Brazoria County, flowed potential of 353.74 bbl. a day on 16/64-in. choke. Gas-oil ratio was 887 to 1, tubing pressure 1,050 lb., gravity 38.3°, 0.1 per cent water, from 48 perforations at 10,135-147 ft. Total depth is 10,848 ft. with 7-in. set at 10,848 ft.

Humble Oil & Refining Co. 33-A State, at Redfish Reef, Chambers County, plugged-back depth 11,161 ft., perforated 11,104-14 ft., and is swabbing for production test.

Roxie Wright et al 1 Stewart & Kountze, east extension at East Mauritz field in Wharton County, is testing in perforations at 5,653-56 ft., showing for an oil well. Total depth is 6,510 ft. with 5½-in. casing set at 5,838 ft.

G. W. Strake B-1 W. Korhn, on southwest side of Conroe field, in Montgomery County, is drilling ahead beyow 10,600 ft. This test topped Wilcox at 8,010 ft., showed gas kick at 9,587 ft. with some sand below that showing gas with distillate odor, then picked up some sand around 10,500 ft. which carried faint gas odor. No oil shows have been reported

UPPER GULF COAST WILDCAT COMPLETIONS

Jackson County: Humble Oil & Ref. Co. 1-C Four Way Ranch, Young Coleman Sur., 1 mi. southeast of North La-Ward field, dry at 6,400 ft.

Jackson County: Moore & Ahern 1 A. E. Westhoff, Joseph Rector Survey, 4 mi. south of Edna, dry at 6,525 ft.

APPALACHIAN FIELD

West Virginia Area Yields 35-Bbl. Well

PITTSBURGH.—In Sherman district, Calhoun County, West Virginia, McCall Drilling Co. completed a second test on the Ora D. and A. A. Weaver farm which is showing for better than 35 bbl. a day from the Injun sand. The Big lime was logged at 2,126 ft.; Injun 2,276 ft., where it was bottomed. It is about 3 miles west of Stumptown. The initial test on the farm is making about 3 bbl. a day.

In Portland district, Preston County, an interesting experiment is being tried in directional cable-tool drilling in the Oriskany test on the Harry Sisler farm on Briery anticline which found that section unproductive. It is believed that this test crossed a fault in the Marcellus and from a survey of the hole, it had drifted about 415 ft. northwest and off of the possible subsurface high. It has been plugged back to 975 ft. and there a whipstock will be set and drilling resumed at that point which will be carefully checked by instrument. Markers below that point may prove by correlation any changes in elevation.

On Chestnut Ridge in Wharton Township, Fayette County, New Penn Development Co. et al logged the Tully lime at 6,930 to 7,041 ft. in the wildcat east of the crossroads on Thompson tract and is drilling at 7,189 ft. This is running low and apparently down the east flank of the structure. To the southwest, Greensboro Gas Co. is drilling at 7,144 ft. in 5 Barton and still in the Onondaga chert which now presents the abnormal thickness of 321 ft. The gas gage from the chert beds is still over 800,000 cu. ft.

SOUTH LOUISIANA

New Gas Pay Proven at North Cankton Field

NEW ORLEANS.—A new gas sand has been established at the North Cankton field in St. Landry Parish at Danciger Oil & Refining Co. 1 G. Pothier, Completion was in 20 perforations at 2,790-97 ft. in Pothier sand topped at 2,788 ft. It flowed 742,000 cu. ft. dry gas per day on 12/64-in. choke; tubing pressure was 1,100 lb. The well had been drilled to total depth of 10,255 ft. before plugging back for completion as a shallow gasser. It topped Discorbis at 7,190 ft., Heterostegina 7,616 ft., First Marginulina 7,990 ft., Domengue sand 8,395 ft., Burleigh sand 9,510 ft., Boagni sand 9,710 ft., showed salt water; cut fault 10,020 ft., and had sand showing gas at 10,050 ft.

Union Oil Co. of California 1-B State-White Lake, extension West White Lake field, Vermilion Parish, showed 40.6-gravity oil through perforations at 11,820-25 ft. The other two wells in this field produce gas-condensate and oil from just above the 10,700-ft. level. The 1-B State, drilled to total depth 11,996 ft., set 5½-in. casing at 11,894 ft. Test through drill stem in perforations at 11,820-25 ft. showed 7 bbl. 40.6-gravity oil in 4 hours on ¼-in. bottom choke and 5/32-in. top choke, maximum pressure 4,250 lb., pressure dropping to 2,650 lb. near end of the test. These perforations are being squeezed.

Gulf Refining Co. 1 T. L. Stokes, on north flank of the Pine Prairie dome in Evangeline Parish, extends production by completion through perforations at 10,254-70 ft., 10,282-94 ft. and 10,326-33 ft. in the Wilcox zone. It flowed an estimated 304 bbl. daily through ⅛-in. choke, with tubing pressure of 910 lb. Total depth is 10,612 ft., with 5½-in. casing set on bottom.

Sun Oil Co. 1 Button et al, southwesterly outpost at Egan field, Acadia Parish, squeezed perforations at 10,828-33 ft., where it had tested gas-condensate with some water, and reperforated with 76 shots at 10,805-24 ft., and set packer at 10,747 ft. to run new test.

Stanolind Oil & Gas Co. 35-B Gulf Land, northwest flank area at East Hackberry field, Cameron Parish, deep sand test, flowed 25 bbl. of pipe-line oil in 2 hours on ¼-in. choke, gravity 31.3°, tubing pressure 1,360 lb., gas-oil ratio 601 to 1, through perforations at 10,804-16 ft. Total depth is 11,343 ft., plugged back 10,820 ft., set 7-in. casing at 10,600 ft. and 5½-in. at 10,927 ft.

Humble Oil & Refining Co. 1 C. G. Robinson, extension to Laurel Ridge field in Iberville Parish, was completed in perforations at 10,620-30 ft., flowing 32.4 bbl. of 49.3-gravity condensate per day on ⅛-in. choke. Gas-oil ratio was 36,650 to 1 and tubing pressure was 3,700 lb. with 1,350,000 cu. ft. gas per day. Total depth is 10,710 ft. with 5½-in. casing set on bottom.

Pure Oil Co. 2 GATX, second producer

DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 2 crude oil	Distillate, allied products	December PAW quota all oils	Nov. 25 crude oil
Arkansas	80,100	5,100	83,100	80,300
California	878,750	52,000	937,000	875,750
Colorado	9,000	.....	9,500	9,500
Eastern	64,900	8,800	78,200	66,800
Illinois	193,400	12,300	212,300	211,400
Indiana	13,100	.....	13,000	13,200
Kansas	265,250	6,000	280,000	274,200
Kentucky	31,600	2,800	33,800	29,400
Louisiana	363,700	35,300	385,300	363,650
North Louisiana	72,300	.....	.....	72,350
South Louisiana	291,400	.....	.....	291,300
Michigan	47,750	500	47,500	47,800
Mississippi	48,850	.....	53,000	52,950
Montana	23,600	400	23,400	25,550
Nebraska	1,050	.....	1,200	950
New Mexico	104,700	5,600	111,600	104,650
Oklahoma	359,950	27,000	377,000	357,250
Texas	2,132,100	145,000	2,278,000	2,132,300
East Texas	367,900	.....	.....	367,850
East Central Texas	144,500	.....	.....	144,600
North Central Texas	151,200	.....	.....	151,250
Texas Panhandle	94,100	.....	.....	94,150
West Texas	474,000	.....	.....	473,900
South Central (S. A.)	20,050	.....	.....	20,150
South Texas (Laredo)	79,400	.....	.....	79,350
Lower Gulf Coast	247,700	.....	.....	247,650
Upper Gulf Coast	553,250	.....	.....	553,400
Wyoming	92,500	3,500	103,500	88,350
Total United States	4,710,300	304,360	5,026,400	4,734,000
Change from previous week	down 23,700	.....	.....	.....

Total production January 1-December 2, 1944 ..... 1,536,238,000 bbl.
Same period last year ..... 1,375,323,675 bbl.

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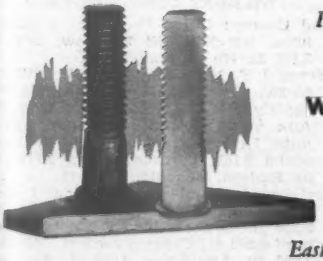

Cutaway view of stud, after etching with Nital.

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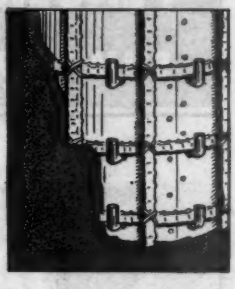
TYPICAL STUD APPLICATIONS



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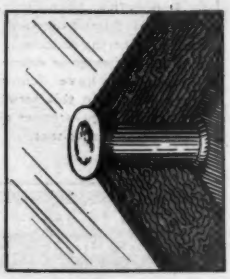
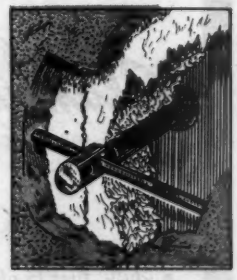


Securing Sheet Metal – Sheet metal to protect soft insulation material is secured with female studs and drive-screws. Studs are welded at 12" centers and insulation impaled over them. Metal covering placed over and secured by tapping screws into studs.



Lagging Studs — Secure magnesia blocks for insulation purposes. The stud is welded, and wire slipped through the hole. The blocks are then placed under the wire and the wire pulled tight. Plaster covering is then installed over lagged area.

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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

in the Good Hope field, St. Charles Parish, is flowing 36.7-gravity oil, no gage, from perforations in the discovery sand at 7,824-36 ft. Total depth is 7,878 ft. with casing set on bottom. The discovery well was completed several weeks ago in perforations at 7,830-38 ft.

MICHIGAN

Deep River and Coldwater Pools Yield Big Wells

SAGINAW.—While Northern Michigan's Coldwater and Deep River oil pools developed further with new producers, hopes for a revival of production in Saginaw County received a double setback last week with completion of two wildcat tests as dry holes.

Basin Oil Co. and Don Rayburn 2 Borushko in Section 9, Deep River Township, Arenac County, came in for better than 100 bbl. per hour and Sohio Petroleum Co. continued the Coldwater-Isabella County string of successes with a 400-bbl. well, 1 Rodgers, Section 29. Smaller wells were completed in Montcalm County's Bloomer pool and in Geneva Township, Van Buren County.

Taggart Bros. completed two more gas wells in Osceola Township, Osceola County, and there were three other dry holes on the week's completion list of 13 tests.

With two new tests planned in Monterey Township, two more in Fillmore Township, Allegan County was listed for four of the 14 new drilling permits granted by the state conservation department.

MICHIGAN WILDCAT COMPLETIONS

Allegan County, Heath Township: Muskegon Development Co. 1 Pegg, SE SW SW 25-3n-14w, dry in Traverse limestone, TD 1,597 ft.

Arenac County, Turner Township: Gordon Oil Co. 1 John R. Staebler, NE SE NE 10-20n-6e, dry, TD 802 ft.

Saginaw County, Richland Township: American Drilling Co. 1 Diener, NE SE NW 4-12n-2e, dry in Monroe, TD 3,463 ft.

Tittabawassee Township: Michigan Producers & Refiners, Inc. 1 George Schmidt, C SE SE 1-13n-2e, dry, TD 3,467 ft.

ILLINOIS

Wildcat and Deepened Well Prove Good Producers

CENTRALIA.—Burr Lambert No. 1 VanSchoick, NW SE NW 18-1n-10e, in the Bennington pool, Edwards County, which was a 75-bbl. well in the Aux Vases sand at 3,131-58 ft., completed in February 1943, and recently producing 15 bbl. per day, was deepened to a pay at 3,216-17 ft., from which it produced 100 bbl., flowing, in 90 minutes through casing, and later flowed 386 bbl. in 24 hours through tubing. This well opened the Bennington pool.

The largest new producer of the week was Phillips Petroleum Co. 8 S. H. Tulley, NE NW NE 21-6s-10e, Concord pool, White County, which produced 600 bbl. in 24 hours following acid treatment in McClosky lime, 2,980-86 ft. and 3,030-44 ft.

Northeast of the North Boos field in Jasper County, Pure Oil Co. found production in a wildcat, 1 Theo Dohm, SW SW SE 34-7n-10e, which produced 213 bbl. in 24 hours from McClosky lime at 2,665-70 ft., total depth 2,715 ft. It is about 1 mile from other oil wells.

Obering, MacDonald and Lord 3 Becker-I.C.R.R. Co., NW SW 9-4n-6w, Marine pool, Madison County, on a test of Devonian lime pay at 1,731-34 ft., flowed 280 bbl. in 3 hours and 55 minutes. It had not been completed.

Only 31 new operations were reported in the past week, 6 of which were wildcats as follows: H. Johnson 1 J. E. Hill, SE NE SE 30-3n-1e, Marion County; L. J. Loyd 1 Bays, NW NW SE 21-11n-12w, Clark County; Wisconsin Refining Co. 1 Lewis, SE NW NE 22-5n-7e, Effingham County; Nash Redwine 1 E. E. Bundy, SW SW SW 9-7s-5e, Hamilton County; W. Witte 1 William Hardt, CW SW NW 27-9n-5w, Montgomery County; Sohio Petroleum 2 R. F. Imbes, SE SE SE 1-4n-7w, Madison County.

WILDCAT COMPLETIONS

Bond County: Union Producers 1 Accornera, NE NW NE 26-4n-4w, dry at 3,170 ft. No tops available.

Texas 1 F. M. Miller, NW NW NW 22-6n-2w, dry at 2,487 ft. Golconda 806 ft.; Cypress 877 ft., Benoist 1,037 ft., Aux Vases 1,062 ft., McClosky dolomite 1,170 ft., Salem 1,325 ft. Louisiana 2,162 ft., Chattanooga 2,177 ft., no Hudson, Devonian 2,287 ft.

Clay County: Sinclair-Wyoming 1 Leo Haupt, SW SE NW 5-2n-6e, dry at 3,210 ft. Lower Kincaid 2,040 ft., Menard 2,262 ft., Cypress 2,692 ft., Benoist 2,890 ft., Aux Vases 2,966 ft., McClosky 3,054 ft., St. Louis 3,200 ft.

Franklin County: S. D. Jarvis 1 Old Ben Coal, SE NE SE 29-5s-2e, Aux Vases sand 2,712-24 ft., Ste. Genevieve 2,761 ft., Fredonia 2,855 ft., TD 2,866 ft. Pumped 40 bbl. in 24 hours.

E. S. Adkins 1 Collins, NW SW NE 34-4s-7e, dry at 2,301 ft. Upper Kincaid 1,530 ft., Golconda 2,201 ft.

Gallatin County: C. E. Brehm 1 Oldham, NE NE NW 24-9s-9e, dry at 2,837 ft.

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Menard 1,778 ft., Cypress 2,325 ft., Aux Vases 2,648 ft., Ste. Genevieve 2,661 ft., McClosky 2,720 ft., St. Louis 2,828 ft.

Jasper County: Pure 1 Theo. Dohm, SW SW SE 34-7n-10e, 213 bbl. McClosky lime 2,665-70 ft., TD 2,715 ft.

Jefferson County: National Associated 1 J. Kubiak, NE NE NW 24-3s-1e, dry at 2,153 ft. No tops.

Madison County: Texas 1 Ambuchl, NE NE SW 20-4n-5w, dry at 2,822 ft. Barlow 671 ft., Cypress 694 ft., Benoist 920 ft., Aux Vases 947 ft., Ste. Genevieve 1,004 ft., Salem 1,247 ft., Osage 1,410 ft., Chattanooga 1,927 ft., Devonian 1,985 ft., Maquoketa 2,537 ft., Trenton 2,705 ft., Plattin 2,814 ft.

Marion County: Continental 1 F. L. Simmons, NE NE SE 22-1n-4e, dry at 2,863 ft. No tops.

Montgomery County: A. J. Hatfeller 1 Galbraith, C S½ NE SE 14-7n-2w, dry at 1,206 ft. Golconda 960 ft., Cypress 1,069 ft., Benoist 1,143 ft.

Randolph County: General Oil Synd. 4 J. Schmool, NW NW SE 27-4s-7w, dry at 427 ft. Benoist sand 355 ft.

Wayne County: Pure 1 C. E. Keith-A, NW NE SW 15-2s-7e, dry at 3,450 ft. Tar Springs 2,604 ft., Cypress 2,967 ft., Ste. Genevieve 3,304 ft., Fredonia 3,368 ft. No McClosky.

SOUTHWEST TEXAS

Gas Discovery Opens Victoria County Area

CORPUS CHRISTI.—A new gas discovery in Victoria County is Gulf Oil Corp. 1 Mary Simmons, in the Kemper City area, Santiago Serna Survey, producing through perforations at 5,350-58 ft., with total depth of 6,335 ft.

G. W. Strake 1 Marie Crissom, South Caesar field, Bee County, recovered 3,900 ft. of 39-gravity oil on drill-stem test at 6,551-56 ft. through ¼-in. choke top and bottom. Total depth is 6,558 ft. Operators are running 5½-in. casing to set on bottom.

Highland Oil Co. 1 N. M. Johnson, wildcat, 6 miles southwest of Pearsall in Frio County, was dry at 3,974 ft. after testing salt water with show of oil and slight blow at 3,961-74 ft.

Stanolind Oil & Gas Co. 2-B J. T. Gillett, in Petronilla field, Nueces County, on 24-hour potential test made 67.56 bbl. net oil, plus 24 per cent water through ½-in. choke, with tubing pressure of 1,250 lb., casing sealed, gas-oil ratio 5,670 to 1, gravity 35°, from 8 perforations at 8,119-21 ft. Total depth is 8,350 ft.

Sun Oil Co. 2 Pablo Rivas, North Rincon field, Starr County, flowed a 24-hour potential of 118.02 bbl. daily through 9/64-in. choke, with pressure of 500 lb. on tubing and 1,100 lb. on casing. Gravity was 45° and gas-oil ratio was 577 to 1. The well was drilled to 4,396 ft. Operators set 5½-in. casing and perforated at 4,381-94 ft. with 65 shots.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Frio County: Highland Oil Co. 1 N. M. Johnson, 6 mi. southwest of Pearsall, M. A. Rumfield Sur., dry at 3,974 ft.

Gonzales County: Quintana Pet. Corp. 1 Mrs. Ornie B. Lamkin et al, 1½ mi. northwest of Slayden, in Winslow Turner League, dry at 9,120 ft.

Jim Wells County: W. A. Richardson et al 1-A Frances Clark, 2½ mi. southeast of Alice, in Los Presenos Grant, dry at 5,816 ft.

San Patricio County: Drilling & Exploration Co., Inc. 1 W. F. Lovett, 8 mi. north of Leroy, in J. J. Welder ranch, dry at 6,269 ft.

Starr County: Jones & Minton 1 Womble

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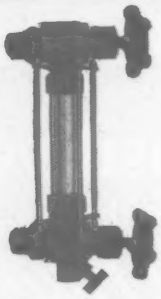

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& Looney, 8 mi. northeast of Rio Grande City, in Porcion 81, Share 77-B, Tract 5, total depth 4,817 ft., gas well, no gage, shut in.

Zapata County: Bridwell Oil Co. 1 Rosa G. De Rodriguez, Charco Redondo Grant, 12 mi. northeast of Lopena, dry at 1,765 ft.

PERMIAN BASIN

Gaines Discovery in Clear Fork Flowing

MIDLAND.—Humble Oil & Refining Co. 1 Doss, new Clear Fork lime discovery in southwestern Gaines County, on 24-hour potential gage flowed 201 bbl. of 33-gravity oil through ¼-in. tubing choke with gas-oil ratio 517 to 1, from lime pay 7,030-83 ft.

Shell Oil Co., Inc. 1 Sparks, wildcat about 7 miles west of the Humble discovery, was testing after setting pipe at total depth 10,604 ft.

Terry County's new wildcat producer, Fikes & Murchison 1 Alexander, treated lime from 5,088-5,157 ft. with 3,000 gal acid and was swabbing oil and acid residue, no gages taken.

Two Upton County wildcats are drawing attention. Standard Oil Co. of Texas 1 McElroy, 6 miles east of McElroy pool, made 15-minute drill-stem test at total depth of 6,819 ft. and reported recovery of 300 ft. drilling mud with show of gas in the bottom. Humble Oil & Refining Co. 1 Parrott, in the eastern part of Upton County, now bottomed at 7,751 ft., with pipe at 7,635 ft., perforated at 7,250-7,310 ft. and was swabbing tubing. The casing perforations are above the level of 7,537-99 ft. from which the well several weeks ago showed 500 ft. of oil on drill-stem test.

In Ector County, Shell Oil Co., Inc. and Cities Service Oil Co. 1 TXL, perforated casing at 8,810-20 ft., in upper part of the Silurian, and started swabbing to test. While drilling, a test of the formation from 8,800-47 ft. recovered 4,970 ft. of oil and 1,730 ft. salt water. Other and perhaps better pays were found in the lower Permian, but these have not been tested since pipe was cemented. The Texas Co. 1-B Fraser, 4 miles south of the discovery, has drill pipe stuck at 7,729 ft.

The Reagan County wildcat test of Superior Oil Co. of California, Wiggins & Hyde 1-B-A University, is drilling below 8,943 ft., believed still in lower Permian lime. Standard Oil Co. of Texas 1-X Durgin, projected deep test in the South Ward shallow area, is drilling below 3,800 ft.

A ¾-mile northwest extension to the Wheeler-Ellenburger pool in Winkler County has been provided at Stanolind Oil & Gas Co. and Shell Oil Co., Inc. 1-C Wheeler, which flowed oil on drill-stem test at 10,541-608 ft., in Ellenburger. Operators set pipe at 10,641 ft. to complete.

The Texas Co. 1 Hogg, wildcat which apparently extended the North Monahans field nearly 2 miles northwest, on potential gage made 563 bbl. per day from Tubb pay topped at 6,100 ft. Total depth is 6,170 ft.

WEST TEXAS WILDCAT COMPLETION

Glasscock County: Richfield Oil Co. 1 S. N. Woody, Sec. 9, Blk. 36, T-3-S, T&P Sur., NW part of county, elev. 2,569 ft., San Andres 3,710 ft., dry, TD 6,008 ft.

TEXAS PANHANDLE

AMARILLO.—Humble Oil & Refining Co. 1 Hyslop, Deaf Smith County wildcat near the New Mexico border, according to unconfirmed rumor, recovered a very small amount of free oil and about 400 ft. of oil-cut mud on drill-stem test at 6,510-24 ft. It topped Permian at 1,570 ft., Clear Fork at 5,190 ft., Cisco at 6,090 ft., first granite wash at 6,510 ft., with shale and lime breaks to 6,580 ft., and granite wash 6,580-96 ft., total depth, where it is cutting and pulling stuck drill pipe. In Sherman County, Humble 1 Pronger Bros. lost circulation at total depth 4,080 ft. A projected deep test in Donley County, Stanolind Oil & Gas Co. 1 Lewis, is rigging up rotary.

PANHANDLE WILDCAT COMPLETION

Gray County: Smith Bros. 1-E Scott Johnson, Sec. 34, Blk. 3, I&GN Sur., 1 mi. S McLean, elev. 2,850 ft., dry, TD 2,860 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Atlantic Refining Co. 1 Stephens, northwestern Lea County wildcat in 33-14-33, recovered 400 ft. salty sulfur water on drill-stem test at 4,960-5,015 ft. and drilled ahead. Continental Oil Co. 2-B-23 Skaggs, Ordovician failure east of Monument, showed 7,500 ft. sulfur water on 60-minute test of perforations 8,850-8,980 and 9,005-35 ft. and plugged back to perforate opposite shows in lower Permian. Humble Oil & Refining Co. 1 Federal-Keinath, 8-21-38, was drilling below 9,595 ft. Culbertson and Irwin, Inc. 1 Culbertson, a Delaware sand wildcat, SW NE, 26-22-32, prepared to spud.

In the northwestern part of the state, Kates & Sidwell 1-A Sauble, Section 35-27n-24e, Colfax County, was drilling below 150 ft.

SOUTHEASTERN NEW MEXICO WILDCAT COMPLETIONS

Eddy County: Engas Co. 1 Pecos Irrigation Co., 9-25s-28e, 6 mi. NW Red Bluff, elev. 2,983 ft., dry, TD 3,043 ft.

Lea County: Stanolind Oil & Gas 1-M State, 32-19s-35e, elev. 3,743 ft., dry, TD 3,985 ft.

N. CENTRAL TEXAS

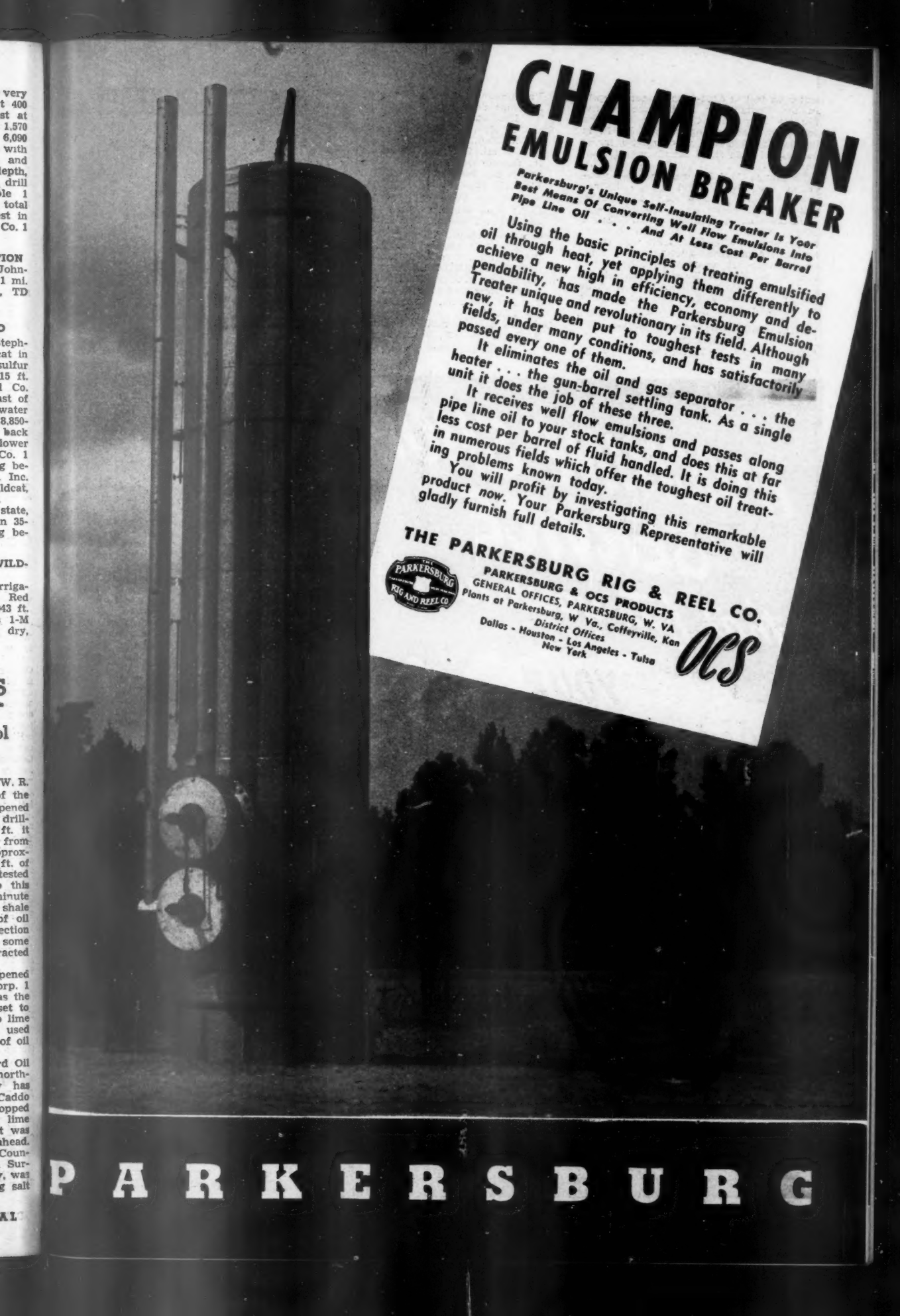
Second King County Pool Indicated by Ohio Well

WICHITA FALLS.—Ohio Oil Co. 1 W. R. Ross, a wildcat 9 miles east of the Bateman pool, apparently has opened King County's second oil field. After drilling lime showing oil at 5,234-38 ft. it made a 15-minute drill-stem test from 5,234-40 ft., total depth, recovered approximately 525 ft. of clean oil and 75 ft. of mud cut with oil and gas. Section tested is believed in the Cisco. Prior to this show, operators had made a 30-minute drill-stem test of sand and sandy shale at 5,120-33 ft., recovering 225 ft. of oil and 390 ft. of salt water. It is in Section 24, R. B. Masterson Survey A-1,163, some 16 miles east of Guthrie, and is contracted to 6,800 ft.

The new Wilbarger County pool opened in October by Fain-McGaha Oil Corp. 1 Martin gained its second producer as the same firm's 1 Sumner, an east offset to the discovery, logged the Palo Pinto lime pay at 4,778-4,806 ft., total depth, used 1,500 gal. acid, then flowed 92 bbl. of oil in 15 hours.

In Clay County, Anderson-Prichard Oil Corp. 1-A Wood, wildcat 10 miles northwest of Henrietta which already has shown oil on drill-stem tests in Caddo lime and Bend conglomerate pays, topped Ellenburger at 6,521 ft., drilled dry lime at 6,521-39 ft., total depth, where it was knocking bridge out of hole to drill ahead.

The Texas Co. 1 Harrison, Archer County wildcat in Section 1,846, T.E.&L. Survey, 8 miles southeast of Archer City, was shut down for orders after showing salt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water on test at 5,931-6,043 ft., total depth. In the Vogtsberger field, same county, Phillips Petroleum Co. 1 Bullington, a deep test, was drilling below 7,507 ft. in lime with no shows reported. So far it has logged 2,274 ft. of Ellenburger formation.

The Texas Co. 1 Rasure, new pool opener in the Sivels Bend area, northern Cooke County, pumped 139.67 bbl. oil, no water, in 24 hours on completion gage, from 6,700 ft. in Strawn sand. Phillips 1 Reitar, Section 18, J. M. Culp Survey, logged streaks of conglomerate with slight oil shows between 3,024-3,186 ft., total depth, where it was taking a drill-stem test. R. W. Fair & Sons 1 Walterscheid, E. Langford Survey, filled 2,500 ft. with oil after perforating casing at 3,044-49 ft. and will go on pump.

NORTH CENTRAL TEXAS WILDCAT COMPLETIONS

Archer County: S. F. Hutcheson 1 V. F. Vetienheimer, Sec. 60, Blk. 4, Clark & Plumb Sur., 2 mi. S Windhorst, dry, TD 1,023 ft.

Chas. E. Morrison Drlg. & Prod. Co. 2 W. R. Hammond, Lot 5, H. Corzine Sur., 3 mi. S Luke Wilson, elev. 945 ft., flowed 504 bbl. day through ¼-in. choke on 2-in. tubing, gravity 41.6, TD 4,175 ft.

Collin County: Pure Oil Co. 1 D. W. Light, Jno. Ragsdale Sur., 3½ mi. S and 1 mi. E Celina, dry, TD 5,966 ft.

Hardeman County: Amerada Petroleum Corp. 1 C. G. Conley, Sec. 89, Blk. H, W&NW Sur., 8 mi. SE Quanah, elev. 1,472 ft., dry, TD 5,800 ft.

Throckmorton County: Bridwell Oil Co. 1 Joe Harris, Sec. 970, TE&L Sur., 3 mi. N Woodson, elev. 1,284 ft., dry, TD 2,235 ft.

Grisham & Hunter 8 P. S. Harrington, B&B Sur. A-1,427, 10 mi. S and 2 mi.

(Continued on page 132)

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ROCKY MOUNTAIN

Crook's Gap Discovery Shuts Off Water

DENVER. — Sinclair - Wyoming Oil Co. Crook's Gap discovery, 1 State, NW SW NW 18-28n-92w, Fremont County, Wyoming, was completed for 1,478 bbl. of 36.2°-gravity clean oil. After several drill-stem tests which definitely proved the opening of a new pool, but which showed some water in the formation, a squeeze job was run and the casing was reperforated after an electric survey of the hole had been completed. The total depth is 5,275 ft., and ground elevation is 6,578 ft. The electric log put the top of Dakota at 5,055 ft. and of the Lakota at 5,225 ft. The 7-in. was cemented at 5,313 ft. The reperforations were at 5,232-44 ft.

The new field is located 18 miles northwest of the Lost Soldier field in Sweetwater County, and 24 miles southeast of the new discovery in the Embar-Tensleep at Big Sand Draw. The two fields will be conneited with the pipe-line system from the Sweetwater-Carbon County fields, and preliminary surveys for the line have been run.

Big Sand Draw gets more Tensleep saturation—The Tensleep sand oil discovery at Big Sand Draw, where Sinclair-Wyoming Oil Co. is operator for the unit, gives increasing evidence of being a big well as drilling deeper into the sand continues. The unit well is located in the SW NW NW 14-32n-95w. After passing through heavy production in the Embar horizon, it topped saturation in the Tensleep at 7,285 ft. A drill-stem test at 7,338 ft., 53 ft. in the sand, showed 6,662 ft. of 35.5-gravity greenish brown oil in 2 hours. It was coring at last report at 7,431 ft., and still in saturated sand, having made 93 ft. of additional hole and penetrated a total of 146 ft. of Tensleep pay so far. There is not much gas in the lower part of the sand. It is probable the well will be completed in the Tensleep and gas and oil in the Dinwoodie-Embar sands saved for later development.

Steamboat Butte discovery holds up.—British-American Oil Producing Co. 4-E Tribal, NE SE NW 5-3n-1w, Steamboat Butte structure, Fremont County, Wyoming, is still testing the Lakota in which a discovery was made 2 weeks ago. Total depth is 5,173 ft., top of Lakota is 4,493 ft., and a drill-stem test at 4,506-62 ft. showed 3,906 ft. of 38-gravity oil in 45 minutes. After squeezing off, casing was perforated with 72 holes at 4,524-46 ft., and it swabbed at the rate of 50 bbl. an hour. It was reperforated at 4,524-44 ft. with 57 shots and flowed 192 bbl. in 24 hours. Then it was perforated with 82 holes at 4,500-15 ft., but showed increase in gas only. Discoveries in this field recently were made in the Sundance and Tensleep. Steamboat Butte is 50 miles northwest of Big Sand Draw.

Rangely extension testing. — California Co. 1 McLaughlin-Government, SE NW 24-2n-103w, Rangely dome, western Colorado, a 1¾-mile extension in the Weber formation, which looks like a better well than the discovery, flowed 9 bbl. an hour in a 38-hour test with the hole only 87 ft. in the pay. The discovery well had a 668-ft. section of exposed saturated Weber formation. The new producer set the 7-in. on top of the pay at 5,960 ft., and was drilled to 6,047 ft. It is not a completion.

Pacific Western to test Lucerne.—Pacific Western Oil Corp. has made a location for a Tensleep test on the Lucerne dome, Hot Springs County, Wyoming, in its 1 Kathrine Weadick, NE SW NE 22-43n-94w. It is a small high on the southwest flank of the Big Horn Basin, lo-

(Continued on page 132)

EASTERN TEXAS

Titus County Wildcat to Explore Smackover

DALLAS.—Started as a Travis Peak test, but now well below that section and headed for the Smackover lime, Humble Oil & Refining Co. 1 Searcy, 1 mile south of Mount Pleasant in Titus County, may set a new depth record for East Texas. It topped Cotton Valley at 9,130 ft. and is drilling below 10,078 ft. in hard sand, possibly still several hundred feet above the Smackover.

The Texas Co. 1 Stout, Van Zandt County wildcat, 2½ miles southwest of Tundra and ½ mile north of same company's 1 Easley dry hole, will try to complete as a producer from the Rodessa zone. Bottomed at 8,161 ft., it logged 10 ft. of porosity 8,150-60 ft., took drill-stem test 8,154-60 ft., recovered 90 ft. of oil, 150 ft. mud and 90 ft. salt water, with 3,200 lb. shut-in bottom-hole pressure. Casing was being run.

Bobby Manziel 1 Evans, Wood County wildcat 2 miles east of Quitman, with casing perforated 4,860-4,905 ft. and 4,914-44 ft., opposite sub-Clarksville sand, is showing a small quantity of 20-gravity oil, while swabbing and probably will try to complete as a commercial pumper. In the Manziel field, Shell-Sun 1 Herring-Scoggins Unit, which has been flowing and testing for some time from the Rodessa pay section, was completed for 3,230,000 cu. ft. gas daily with estimated 29 bbl. condensate per 1,000,000 cu. ft.

Hamman Oil & Refining Co. 1 Gibson, Robertson County discovery producer west of Calvert, is reported averaging 55 bbl. daily, pumping, from 2,194 ft. The same operator's 2 Gibson, bottomed at 2,242 ft. in shale, is testing on pump, making 95 per cent salt water. Surface pipe has been set at 4 Gibson, new test offsetting the discovery.

EAST TEXAS WILDCAT COMPLETION

Wood County: Sinclair Oil Co. 1 J. W. and Minnie Collins, Renlarez Sur., 7 mi. NW Hawkins, elev. 494 ft., Woodbine 5,570 ft., Goodland 7,873-7,975 ft., Paluxy 7,795 ft., dry, TD 8,271 ft.

OHIO, KENTUCKY

Three Wells Added in Corning Grade District

COLUMBUS.—A gradual increase in the number of drilling wells in the Corning grade oil areas resulted in three producers last week, and three this week. Pure Oil Co. 15 W. H. Ashcraft, Section 14, Pike Township, Coshocton County, made 55 bbl. in the Clinton at 3,270 to 3,318 ft. In the same township, Allen Willey 1 H. Anderson, Section 3, produced 41 bbl. at 3,188 to 3,238 ft.

The Sandyville field had three completions, two in the Richville pool. Fry et al 1 Simon Brinker, Section 1, Bethlehem Township, Stark County, gaged 2,304,000 cu. ft. of gas natural. In the same township, Ed Obermiller 1 H. Engleman, Section 12, gaged 800,000 cu. ft. Burtner M. & S. 1 Jay Farber, Section 25, Pike Township, gaged 1,017,000 cu. ft. when shut in after shot.

The South Spencer pool was extended ½ mile to the south by Glen Harmon 1 Ira Hisey, Section 24, Homer Township, Medina County. Clinton pay at 2,688-94 ft. gaged 1,247,000 cu. ft. when shut in after shot.

OHIO WILDCAT COMPLETIONS

Lorain County, La Grange Township: Hanley & Bird 1 I. J. Swartz, Lot 32, Clinton 2,455-61 ft., dry, Clinton 2,472-80 ft., 27,000 cu. ft., TD 2,546 ft.

Summit County, Norton Township: J. C. Steiner 1 C. Seiberling, Lot 51, Clinton 3,747-3,820 ft., dry, TD 3,910 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Sinclair Prairie Oil Co. 2 B. F. Humphrey, 1½ miles southwest of the Smith Mills pool in Henderson County, in a test of the lower Levias lime at 2,554-66 ft., showed 425 ft. of oil, with gas, drilling mud and some salt water, in 15 minutes.

W. F. Lacy 1 T. T. Williams, a wildcat in 4-O-20, 1½ miles south of Mount Vernon, Ind., but in Henderson County, Kentucky, filled 1,385 ft. with clean oil after the plug was drilled. The pay is Aux Vases sand at 2,599-2,606 ft. The test is 3 miles from other production.

Eight oil wells and five dry holes were completed in Western Kentucky in the past week. The oil wells averaged 47 bbl. per well initially.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Todd County: Jarvis Bros. and Marcell 1 Stinson, 4 mi. NW of Elkton, dry at 1,815 ft. Devonian lime top at 1,613 ft.

Union County: Thurston, Cooke & Locke 1 Smith-Proctor, SE NW SE 4-P-20, Penn. sand at 1,030-41 ft., TD 1,055 ft. Pumped 16 bbl. of oil per day.

EASTERN KENTUCKY

ASHLAND.—Drilling operations pointed upward in eastern Kentucky during the

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week, and a recent drilling report shows several completions. Included in the report are five dry holes, three gas wells with good production and two operations which were in the nature of a deep test.

The combined production of new gas wells shows a daily open flow of 16,307,000 cu. ft., with a reported total footage of 82,308.

Two wells in Pike County contributed nearly half of the newly developed gas production. Utility Elk Horn Coal Co.'s completion on fee Tract 11, Shelby Creek, registered open flow of 5,367,000 cu. ft. daily from Maxon sand drilled to total depth of 1,498 ft. Warfield Gas Co. 5,382 Kentland company, Gabriel branch, Johns Creek, flowed 2,711,000 cu. ft. daily from lime at total depth of 2,580 ft.

Other gas completions were of routine nature, mostly flowing around 100,000 to 500,000 cu. ft. daily.

INDIANA

EVANSVILLE, Ind.—Two oil wells and four dry holes were reported completed in Indiana in the past week. A 100-bbl. well in the New Harmony South pool was the best of the oil wells. No wildcats were completed.

CANADIAN FIELDS

Shell Testing Madison on Jumping Pound Structure

CHATHAM.—In the Jumping Pound area west of Calgary, Shell Oil Co. 4-24-J, LSD 4 24-25-5w5, has the Madison limestone at 9,618 ft. and is making electrolog, velocity and directional surveys before drilling in. Madison lime here, though deeper than in Turner Valley producers, was higher than in Shell-Norman 1, which finished below 12,000 ft. to establish a depth record for Canada.

Raymond.—In the Raymond area, 15 miles south of Lethbridge, Imperial-Clancey-Raymond 1, LSD 7, 16-6-20w4, cored 32 ft. with good oil saturation after getting Madison limestone at 3,914 ft. and is making drill-stem test.

Prince Edward Island.—Socony-Vacuum and Cities Service's joint test in Hillsborough Bay, opposite Charlettetown, Prince Edward Island, is below 11,590 ft., with formations reported more encouraging. Drilling operations may be continued at least 2,000 ft.

CALIFORNIA

Deeper Pay Showing in Amerada's Ant Hill Pool

LOS ANGELES.—Amerada Petroleum Corp. proved up a deeper pay in the Ant Hill pool which it discovered a few months ago in Kern County but the deep zone discovery was a relatively small well doing 182 bbl. of 37.8-gravity oil daily from the Jewett zone at 3,724 ft. This hole was carried down to 4,250 ft. and then plugged back to 3,724 ft. and the 7-in. casing gun perforated at 3,670-80 ft. and at 3,690-3,700 ft. The upper zone in this pool has been yielding 40 bbl. pumpers and the lower zone has been found more prolific and in addition is yielding a light gravity oil. The gravity of the upper zone is around 16° which places it in the fuel-oil class.

California had another wild well to cope with this week but it only burned for about 20 hours before being brought under control. This blowout occurred at Huntington Beach and involved Standard Oil Co. of California 72-A Huntington in the Barley Flats section of the field. The well got away just after the crew had come out of the hole and caught fire

Buena Vista Hills had another blowout this week when gas from Standard 325-26-B began blowing from an old Calitroleum zone completion at a daily rate of from 20,000,000 to 30,000,000 cu. ft. The gas from 325-26-B started blowing around the casing in 12-26-B, located 660 ft. west of the former and bottomed at 2,933 ft.

Shell Oil Co., Inc. completed what may either be a new gas discovery in Fresno County at Herminghaus in 22-13s-16e, or an easterly extension of the Mendota gas pool discovered by The Texas Co. Another well or two will be required to indicate structural conditions in the Mendota-Herminghaus area with any degree of certainty. Shell's new well showed an initial of 3,000,000 cu. ft. of gas daily from 5,765-68 ft. but its capacity is larger, pressures showing 1,675 lb. against a 9/64-in. choke.

CALIFORNIA WILDCAT COMPLETIONS

Fresno County, Herminghaus district: Shell 25 Edison Securities, 22-13s-16e, flow 3,000,000 cu. ft. gas, no oil, 9/64-in. bean, pressures 1,675-1,650 lb., TD

(Continued on page 132)

OKLAHOMA

W. Edmond Allowable Reduced to 150 Bbl.

AS anticipated, the state corporation commission formally ordered a reduction in the daily per well allowable in West Edmond field from 200 bbl. to 150 bbl., effective December 1. Seventeen producers were completed during the week, bringing the total number of producers to 272. Pipe-line runs averaged 45,100 bbl. daily from 255 wells connected.

Cities Service Oil Co. 1 Gaffney, SE NE 29-15n-4w, which was too far east to get the Hunton pay, but which showed for a gas and condensate well, has retested after repairing casing leak, and flowed 220 bbl. of condensate with 5,000 000 cu. ft. of gas.

Phillips Petroleum et al 1 Dublin, NE NE 18-15n-4w, attempted north extension, is reported fishing at 7,115 ft., enroute to the Wilcox, with indications that it missed the Bois d'Arc pay in the Hunton. Anderson-Prichard Oil Corp. 1 Collett, SE NW 25-15n-5w, attempted northwest extension, topped Woodford shale at 6,934 ft., Hunton at 6,985 ft., and had stained cuttings at 7,015 ft. The well may test the Wilcox and then plug back.

Logan County.—The Texas Co. 1 LeGrande, NE NE SW 26-15n-1w, southeast Logan County, is reported checking high compared to the Jordan wells in Arcadia area. Tops reported are Layton 4,270 ft., Checkerboard 4,295 ft., Cleveland 4,505 ft., and Oswego 4,950 ft. Drill pipe is stuck at 5,452 ft., and operator is working to free it.

McClain County.—Carter Oil Co. 1 Lamar Ranch, NE SW 28-8n-3w, is reported drilling in Viola, topped at 10,454 ft. With top of Viola at —9,216 ft., this indicates the test is running 136 ft. lower than the Cottingham discovery well of the Washington pool to the south, and a 5-ft. thickening of the Sylvan compared to the Cottingham.

OKLAHOMA WILDCAT COMPLETIONS

Atoka County: Northern Ordnance 1 Fulton Ranch, SE SW SW 19-1s-12e, dry, TD 7,022 ft.

Hughes County: Schermerhorn 1 Harris, NE NE NE 5-7n-9e, dry, TD 3,718 ft., second Cromwell 3,670 ft.

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Love County: Kimball & Bohner 1 Hubbard, NE NE 32-9s-2e, dry, TD 5,240 ft., Arbuckle 4,996 ft.

Pawnee County: Sunray 1 Ryan, SW SE NW 33-21n-6e, pumped 26 bbl. from pay zone 2,727-45 ft., TD 3,339 ft., Prue 2,727 ft., May 3,142 ft., Woodford 3,262 ft., Misener 3,287 ft., Simpson 3,292 ft., second Wilcox 3,324 ft. Danciger 1 School Land, SW SE 36-21n-5e, dry, TD 3,222 ft., Bartlesville 3,170 ft.

Pottawatomie County: Texas 1 Case, SW NE NW 17-10n-5e, dry, TD 4,861 ft., Wilcox 4,755 ft.

Seminole County: Skelly 1 Swan, SW NE 23-5n-5e, pumped 15 bbl. of 37°-gravity oil from pay zone 2,276-2,448 ft., TD 2,460 ft., Hunton 2,276 ft., Sylvan 2,448 ft.

Stephens County: Wisdom et al 1 Walters, SE SE SW 3-1s-8w, dry, TD 5,808 ft.

KANSAS

Two Ellis County Strikes Feature Kansas Operations

A PROBABLE new pool southeast of the Bemis Shutts pool in Ellis County is indicated by H. E. Alexander's No. 1 Schmeidler, NW NW SE 28-12-17w. Perforations and acidizing at 3,624-36 ft. brought 900 ft. of oil up in the hole and 2½ bbl. oil per hour was swabbed. At 3,647 ft., 2,000 ft. of oil with no water rose in the hole in 36 hours, after acidizing. Operators are testing. Tops for this well are Anhydrite 1,312 ft., Lansing 3,394 ft., Simpson 3,614 ft., and Arbuckle 3,625 ft.

Ellis County.—Max Cohen 1 Madden, NW NW NE 4-13-17w, northwest of the Catherine pool, has logged both oil and water. The Arbuckle was cut at 3,582 ft., where 5-in. pipe was set. Other tops are Anhydrite 1,260 ft., and Lansing 3,324 ft.

McPherson County.—P. G. Reynolds and Veeder Supply Co. 1 Koehn, NW NE NW 13-20-2w, just south of the Ritz-Canton pool, is running casing. A drill-stem test at 2,980 ft. showed 900 ft. of oil and oil-cut mud and 20 ft. water, from the chat.

Phillips County.—Skelly Oil Co. 1 Thayer, SE SE NE 34-5-19w, about 7 miles east of the Ray pool, is setting 5-in. pipe at approximately 3,486 ft. A slight show of oil was found from 3,270-77 ft., and slight porosity and stain from 3,485-90 ft. The Lansing was topped at 3,204 ft., the base of the Lansing cut at 3,427 ft., Arbuckle at 3,427 ft., and the present depth is 3,490 ft. Elevation on the well is 1,222 ft.

(Continued on page 136)

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended Dec. 2, 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	1	1	2	2	0	19	63	84
Indiana	0	0	0	0	0	4	0	0	24	28
Illinois	2	0	0	11	13	35	0	0	314	349
Kentucky	1	0	0	1	2	16	0	0	78	94
Michigan	0	0	0	4	4	12	0	4	226	242
Kansas	0	0	0	12	12	49	0	9	414	472
Neb., Mo., Iowa	0	0	0	0	0	1	0	0	15	16
Oklahoma	2	0	0	6	8	70	1	20	263	354
Texas:										
North Central	3	0	0	13	16	64	0	1	303	368
West	0	0	0	1	1	40	0	3	165	208
Panhandle	0	0	0	1	1	0	0	2	10	12
Eastern	0	0	0	1	1	6	0	5	115	126
Gulf Coast	0	0	0	4	4	33	12	14	215	274
Southwest	0	0	1	3	4	23	4	16	216	259
Total Texas	3	0	1	23	27	166	16	41	1,024	1,247
Louisiana:										
Northern	1	0	0	1	2	6	2	2	57	67
Southern	0	0	0	0	0	10	6	1	43	60
Total Louisiana	1	0	0	1	2	16	8	3	100	127
Arkansas	0	0	0	0	0	2	1	0	53	56
Mississippi	1	0	0	0	1	4	0	0	63	67
Ala., Ga., Florida	0	0	0	1	1	2	0	0	29	31
Montana	0	0	0	2	2	4	0	4	46	54
Wyoming	1	0	0	2	3	19	0	2	25	46
Colorado-Utah	0	0	0	1	1	3	0	1	26	30
New Mexico	0	0	0	2	2	7	0	3	52	62
California	0	0	1	3	4	7	0	9	174	190
Total United States	11	0	3	70	84	419	26	115	2,989	3,549
Total previous week	8	0	1	52	61					

LA.-ARK.

Haynesville Deep Test Flows From Cotton Valley

SHREVEPORT, La.—An old well drilled deeper, and classified as a wildcat, was the best completion of the week in North Louisiana. Ohio Oil Co. 1 G. W. Taylor account, in 15-23n-8w, started off at 377 bbl. per day from Cotton Valley formation logged at 8,835-75 ft. and 8,910-20 ft.

Magnolia Petroleum Co. 1 McDonald unit, 70 ft. south and west of NE cor. SW NE 2-10n-8w, Lisbon field, produced 210 bbl. of distillate in 24 hours from Vaughn sand at 8,440-55 ft. and Burgess sand at 8,836-96 ft., total depth 8,940 ft.

NORTH LOUISIANA WILDCAT COMPLETIONS

Claiborne Parish: Ohio 1 Taylor Acct. 4-P, deep discovery in Haynesville pool, approx. NE SW SE 15-23n-8w, 377 bbl. of 43.8°-gravity oil from pay zone 8,835-75 and 8,910-20 ft., TD 11,270 ft., Cotton Valley 8,835 ft.

La Salle Parish: Placid Oil F-2 Tremont, SE NW 28-9n-2e, dry, TD 8,040 ft.

MISSISSIPPI

Lamar County Wildcat Makes 757-Bbl. Output

JACKSON.—Gulf Refining Co. 1 C. V. Cooper, a wildcat in C NE NW 7-1n-16w, Lamar County, was completed in pays at 8,690-8,714 and 8,734-44 ft., total depth 9,080 ft., and produced 757 bbl. in 24 hours. It was the largest completion reported during the week in the state.

Sun Oil Co. 1 Hammett, in 2-11n-1w, Claiborne County, was completed as a gas well. It made 5,000,000 cu. ft. per day from the base of the Moody Branch at 935-45 ft., total depth 2,324 ft.

MISSISSIPPI WILDCAT COMPLETION

Lamar County: Gulf 1 Cooper, NE NW 7-1n-16w, discovery Baxterville pool, 757 bbl. of 16.5°-gravity oil from Massive sand at 8,690-8,714 and 8,734-44 ft., TD 9,080 ft.

FLORIDA WILDCAT COMPLETION

Leon County: Stanolind 1 St. Joe Paper Co., approx. NE NE 15-2s-2e, dry, TD 6,520 ft.

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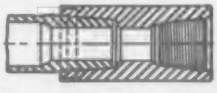
APPLICATION: Accepted method of application is to under-cut new or resleeved joints at the shoulder to form a recess 1/8" deep by 1 1/2" wide. The recess is then filled by welding in with 1/4" Electric Tube Borium to form the wear resistant inlay.



Write for this special Stoody engineering bulletin describing in detail hard-facing procedures on tool joints—no obligation.

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Retard wear . . . Save Repair

Among the Drilling Contractors

General Petroleums of Calgary has a contract with Bata Petroleums for No. 3 well, recently spudded in the Muddy Lake-Unity area of western Saskatchewan, Canada.

KDK Corp. of Vermilion, Alta., which recently completed a series of wells in the Vermilion field for Cannar Oils, has a contract with Edgerton Oils, Ltd., of Edmonton for a new well 7 miles south of Edgerton, Alta. A previous test abandoned owing to drilling difficulties at 2,500 ft. showed encouraging indications.

Williams Drilling Co. has been awarded drilling contract on the Anderson-Prichard Oil Corp. 1 Bartholomew, in NW NW NW 8-27-4w, Sedgwick County, Kansas.

Davis Brothers Drilling Co. has the contract and was drilling at 350 ft. on the Fox 1 fee, in SE SE SW 12-51n-35w, about 2 miles north of Waldron, in Platte County, Missouri.

Pace Drilling Co. was scheduled to move in immediately on the 1 Morrow, in NW NW NE 33-1n-1w, 3 miles southwest of the new Hoover area in southern Garvin County, Oklahoma. Contract is for 3,000 ft.

Prince Brothers Drilling Co. of Electra, Tex., is moving rig in Brooks County, Texas, to drill Standard Oil Co. 1 Pena 4. The firm also has rigs running in Andrews County and Pecos County, Texas, for Standard Oil Co.

Camay Drilling Co. has the contract to drill Shell Oil Co., Inc., 1 Stakemiller-Rose, a projected deep test in the Long Beach field of Los Angeles basin, and spud was made several days ago.

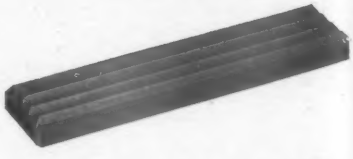
King Drilling Co. has announced appointment of B. R. Scharbarum as equipment engineer. Scharbarum, who before his new connection was associated with Empire Oilfield Shop at Odessa, Tex., will work out of the Midland headquarters.

Oil Ventures of Calgary, headed by Neil McQueen, has contract to handle testing and completion operations on Pacific Oil & Refining 3, LSD 1, 10-2-20w4, in the Twin River field, southern Alberta. W. H. Dyson will superintend. This well, first test of the Devonian limestone in the Twin River area, is in Madison lime below 4,600 ft.

George Terry, Bakersfield, Calif., has been awarded drilling contracts for three wells to be drilled for Shell Oil Co., Inc., in the Sacramento Valley, California, and for six wells to be drilled for Bradford Bishop in the Poso Creek area. They will not be drilled simultaneously but may keep three strings of tools in operation.

D. W. "Red" Spencer, assistant division production superintendent in West Texas and New Mexico for Sinclair Prairie Oil Co. and affiliates since 1940, has resigned from that

WEB WILSON
Tong Dies



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SEE COMPOSITE CATALOG
PAGES 3101 TO 3120

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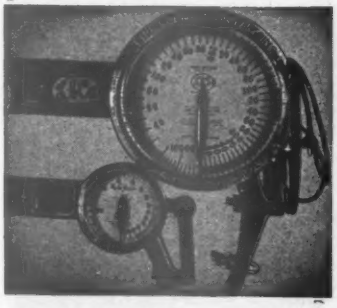

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concern to go into the drilling contracting business in Midland, Tex. He plans to do most of his drilling in New Mexico. He will operate rotary rigs.

Parker-Duerr Drilling Co. is to drill the Hanlon & Buchanan, Inc., and others 1 Heiring, in SE SE SE 18-19-2e, a shallow test well in the Ramsey pool of Payne County, Oklahoma. The Tulsa firm obtained a block of five quarter sections from Robert A. Arnold.

Coats & Hearrell Drilling Co., Oklahoma City, announced that W. S. Leaverette has joined the company. Leaverette has moved to Oklahoma City from Pampa, Tex.

Kendrick Brothers is the contracting firm on the R. H. Crow and H. C. Owens 1 Thigpen-Herold, in NE 24-17n-16w, Caddo Parish, Louisiana. The test will be made to the 2,800-ft. zone on a surface area of 40 acres.

Fred Morgan, drilling contractor and producer who left Oklahoma City following the boom there to drill in northern Oklahoma and Kansas, has returned to Oklahoma City to make his home.

"Bugaboo of Technicality" Stripped From Handbook

OKLAHOMA CITY.—The "bugaboo of technicality" will be stripped from a handbook on oil and gas conservation which is being prepared for publication and distribution by Interstate Oil Compact Commission. Ted Knopp, secretary of the commission's interstate relations committee, says the book will be free of perplexities.

With members from nine oil-producing states, headed by Oklahoma's former governor, W. J. Holloway, the committee has been commissioned to prepare the simplified handbook.

CALENDAR

December

Interstate Oil Compact Commission, quarterly meeting, Jackson, Miss., December 15-16.

April 1945

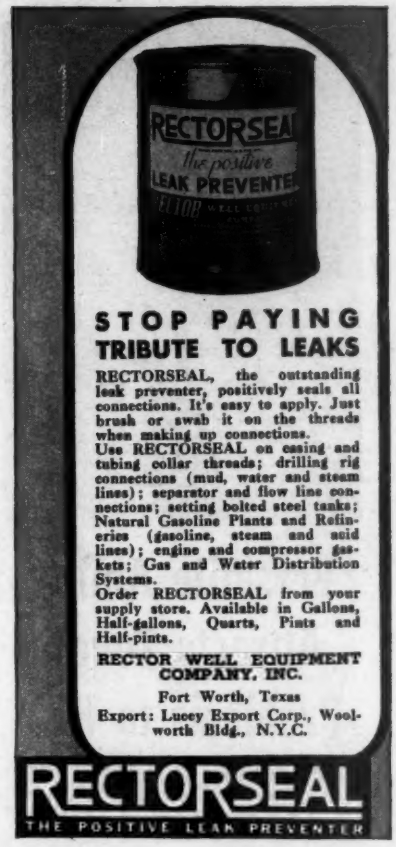
American Gas Association, annual conferences of technical section, Stevens Hotel, Chicago, April 4-6.

I.P.A.A., midyear directors meeting, New Orleans, La., April 9, 10 and 11.

October 1945

Texas Mid-Continent Oil and Gas Association, Rice Hotel, Houston, October 4-6.

I.P.A.A., annual membership meeting, convention city to be selected later, October 15, 16 and 17.



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PERSONALS

Versatile Ability Attracts Tough Problems to Him

FRED A. LICHTENHELD, division engineer for Cities Service Oil Co., Oklahoma City, is considered one of the most versatile men in his profession. Frequently, he is enlisted as "trouble shooter" in the study and solution of special engineering problems.

He joined Indian Territory Illuminating Oil Co. at Bartlesville in 1926 after serving 6 years with the Bureau of Mines and the Rocky Mountain Petroleum Association at Casper, Wyo., Washington and at Fort Washakie, Wyo., where he supervised drilling and production operations on Indian and government land in that area and in the Big Horn basin.

Until Seminole was discovered, Lichtenheld devoted most of his time to studies of secondary-recovery problems on I.T.I.O. properties. In July, 1931, he was moved to Oklahoma City and assigned work in connection with treating and pumping problems. He supervised the drilling of two wildcat wells in Colorado in 1936 and became division production engineer for Cities Service when that company absorbed I.T.I.O.

He was born at Central City, Colo., and graduated from high school at Denver and from the Colorado School of Mines at Golden with a degree in mining engineering.

Lee Flood, Houston, was chosen chief engineer of the Goldsmith pool engineering committee at its annual meeting in Fort Worth. He succeeds **E. H. Griswold,** who resigned to resume management of his own producing properties. **C. C. Roripaugh,** Midland, Shell Oil Co., Inc., was elected chairman of the executive committee, and **R. R. Porterfield,** Midland, Devonian Oil Co., was reelected secretary-treasurer.

Rex Brannin has been transferred by Magnolia Petroleum Co. from Salem, Ill., to Duncan, Okla., to serve as district superintendent at the latter point. He succeeds **O. H. Stout,** who is retiring.

Edward B. Swanson, formerly associate director of the petroleum conservation division, Department of the Interior, has been placed in active charge of the division. He takes the place of **Jack Steele,** who retired after 20 years' service in the department.

Floyd Green, formerly general attorney for the Oklahoma Corporation Commission, has been appointed conservation attorney.

John C. Edwards has been appointed manager of the crude-oil purchases and sales division of The Texas Co., with headquarters at Houston, to succeed the late A. M. Donoghue. An engineering graduate of University of Michigan, Edwards has been assistant manager of the division several years and has served in the refining department in various capacities, including that of superintendent of the refinery at Sunburst, Mont.

F. W. Floyd, technical coordinator for Creole Petroleum Corp., Caracas, Venezuela, visited Tulsa offices of Carter Oil Co., Tulsa, last week and made inspection trips to several Mid-Continent operations.

Alan G. Skelton, for several years librarian of the school of geology at University of Oklahoma, has joined the Tulsa headquarters staff of Mid-Continent Oil and Gas Association and will have general charge of the association's statistical and information services and library. Before joining the association, Skelton was also a member of the staff of Oklahoma Geological Survey. He prepared "A Bibliography of Oklahoma Oil and Gas Pools," which was published as a bulletin.

Charles J. Barkdull, executive vice president of Standard Oil Co. of Indiana, will retire on annuity January 1. He started as a clerk in 1907. Barkdull is a director of several subsidiaries of the company, and he will retire from their boards also, it was announced.

Newcomb Taylor, who has been with the Hancock Oil Co. of California for over 20 years, and for the past several years manager of the San Francisco branch, has been moved to the Long Beach office as assistant to **Cliff Limbocker.** His successor in San Francisco is **James G. Gross.**

Charles B. Johnson, Jr., has resigned his position with Seismograph Service Corp. to become petroleum engineer for Chicago Corp. at Corpus Christi, in the Agua Dulce area.

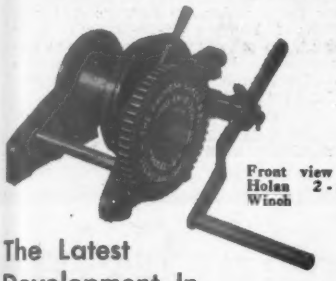
First Lt. Willie D. Sparks, of Shamrock Oil & Gas Corp., Dumas, Tex., recently returned from England after completing 35 missions over Germany. At present he is assigned to Miami Beach, Fla.

Alexander N. Campbell, Torrance, Calif., operator, recently announced the arrival of Suzanne Campbell at the Cedars of Lebanon Hospital in Los Angeles.

William C. Chonette, who was chief engineer in the exploitation department of Shell Oil Co., Inc., in the Los Angeles office, has been appointed manager of Canadian operation. He will maintain offices in Los Angeles.

H. C. Wiess, Houston, president of Humble Oil & Refining Co., and **Roy B. Jones,** Wichita Falls, independent operator in the North Texas district, are to receive the Distinguished Service Award, given each year by Texas Mid-Continent Oil and Gas Association. The award, explained **Maston Nixon,** president of the association, is made to men who, over

IT'S NEW — THE HOLAN 2-TON WINCH



Front view of Holan 2-ton Winch

The Latest Development In Compact, Easily Operated Winches — Tops In Quality

Small and compact, this winch is exceptionally easy to operate and very efficient. Two speed ratios permit handling heavy loads at slow speeds and light loads at high speeds. Perfect control is assured for raising load. When lowering load, control is secured by a single shoe hand brake that has sufficient capacity to hold full load. Full rated load is 4000 lbs., but each winch is tested at factory by applying a load of approximately 6000 lbs.

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a long period of years, have made outstanding contributions to betterment of their home communities, the petroleum industry and their own individual enterprises.

J. M. Wanenmacher, who was area subsurface engineer, in charge of pool studies, in the production department of Shell Oil Co., Inc., Tulsa, has resigned that post to join **C. H. Keplinger** in establishing a consulting practice in petroleum engineering. The headquarters of the new firm, Keplinger & Wanenmacher, will be in Tulsa. Since his graduation from University of Wisconsin Wanenmacher has fulfilled commissions for major oil companies which took him to Colombia, Venezuela and The Netherlands.

Oakland M. Sechler, chemist in the Torrance, Calif., butadiene plant of Shell Chemical Division, has been promoted to research chemist at the same plant.

Jack Danciger, vice president of Danciger Oil & Refining Co., with his office in Fort Worth, and also honorary consul for Mexico in that city, is the subject of a commendatory article in Hemisferio, Mexico City review. The article cites gains made in Texas in elimination of discrimination against Latin Americans and expresses appreciation of Danciger's work in this field.

W. W. Vandeveer, retiring director-in-charge of District 2, Petroleum Administration for War, and **Edward G. Seubert,** chairman of the district's supply and transportation committee, who will retire January 1 as president of Standard Oil Co. of Indiana, were honor guests November 30 at a dinner given in the Blackstone Hotel, Chicago, by **O. D. Donnell,** president of The Ohio Oil Co. The 40 guests included key men in the district organization.

H. L. Briggs, formerly in charge of production activities for Oil Development Co. of Texas and Coline Oil Corp., with headquarters in Amarillo, has moved to Los Angeles, where he is executive vice president of Chanslor-Canfield Midway Oil Co.

M. W. Walters has resigned as division manager of Sohio Pipe Line Co. and Sohio Petroleum Co. (transportation division) in Mount Pleasant, Mich. His plans were not announced, but it was indicated he would join an independent company in the southwestern Michigan area.

James A. Dunn, president of Barnsdall Oil Co., arrived in Los Angeles by plane from New York recently for an inspection of the company's operations in California.

EIGHT interchangeable cutters. Fast cutting action, directed at 30 degree angle, cutters are hard surfaced steel. See Composite Catalog or write for Bulletin and additional information.

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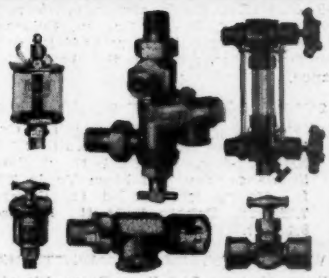

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All are of rugged construction and made by an organization with 57 years experience in the manufacture of quality products.

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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

N. Central Texas

(Continued from page 124)

W Throckmorton, elev. 1,343 ft., pumped 130 bbl. day, TD 821 ft.

Wichita County: Continental Oil Co. 1 F. C. Hunt, J. Dillon Sur. A-353, 3 mi. W Wichita Falls, elev. 951 ft., pumped 145 bbl. day, gravity 40, TD 4,336 ft.

G. J. Scholl 1 D. W. Riley et al, Blk. 95, Red River Valley Lands, 3 mi. N and 1 mi. W Burkburnett, dry, TD 1,801 ft.

Wilbarger County: G. M. Shanor 1 J. P. King, Sec. 2, DL&C Sur. A-1,315, 9 mi. S and 3 mi. W Vernon, dry, TD 2,288 ft.

Young County: Hanlon-Buchanan, Inc. 1 Sallie R. Donnell, Sec. 2,377, TE&L Sur., 3 mi. W and 3 mi. N Murray, elev. 1,246 ft., dry, TD 4,803 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County: M. L. Cordua & S. W. Messer 1 L. W. Boyd, Thos. Pratt Sur. No. 107, 1 mi. S Bango, dry, TD 1,320 ft.

Concho County: Anzac Oil Corp. et al 1 G. R. White, J. H. Huey Sur. No. 4, 1 mi. SE Lightner, elev. 1,937 ft., dry, TD 1,808 ft.

Eastland County: Wm. S. Kelly 1 W. C. Yeager, Sec. 5, BBB&C Sur., 8 mi. W. Cisco, elev. 1,793 ft., dry, TD 491 ft.

Mills County: Emil Ott et al 1 B. H. Yeager, Caldwell CSL Sur. No. 112, 6 mi. W Coldthwaite, elev. 1,367 ft., dry, TD 2,001 ft.

Shackelford County: E. L. Elliott, Agent, 1 City of Albany, Sec. 10, Blk. 11, T&P Sur. ½ mi. NW Albany, elev. 1,460 ft., dry, TD 1,181 ft.

Shell Oil Co., Inc. 1 T. W. Lee, W. M. Woodward Sur. No. 50, 2 mi. SW Albany, elev. 1,425 ft., Mississippian 4,585 ft., Ellenburger 4,604 ft., dry, TD 4,644 ft.

Rocky Mountain Area

(Continued from page 124)

cated 10 miles southeast of the Gebo structure where Continental Oil Co. has production in the Embar and Tensleep, and 12 miles northwest of Kirby Creek where Pacific Western recently completed a small discovery in the Embar.

Bell Rock test abandoned.—Stanolind Oil & Gas Co. 1 Hanawalt, NE SE SE 4-6n-92w, Bell Rock structure, 10 miles west of Craig, Moffat County, Colorado, was dry and abandoned at 9,064 ft., drilling having stopped in the basal Sundance.

COLORADO WILDCAT COMPLETION

Moffat County, Bell Rock: Stanolind, Continental and Ohio 1 Hanewalt, NE SE SE 4-6n-92w, TD 9,064 ft. in basal Sundance, dry, top Mesa Verde 2,856 ft., Mancos shale 3,286 ft., Frontier 7,785 ft., Dakota 8,233 ft., Morrison 8,459 ft.

WYOMING WILDCAT COMPLETIONS

Albany County, East Rock River: Wasatch Oil 1 Malmquist, SW SW SW 33-21n-76w, TD 3,005 ft. in shale, dry.

Fremont County: Crook's Gap: Sinclair-Wyoming 1 State, NW SW NW 18-28n-92w, TD 5,275 ft., top of Dakota 5,055 ft., top of Lakota 5,225 ft., 7-in. 5,313 ft., after squeeze job reperf. at 3,232-44 ft., flowed 1,478 bbl. 36.2°-gravity oil in 24 hours through 2½-in. tubing.

Natrona County, Powder River: Stanolind 1 La Fleiche, NE NE SE 23-36n-85w, TD 4,237 ft., DST at 4,216-37 ft., open 1 hour, 4,160 ft. of water, tested through Tensleep, dry.

MONTANA WILDCAT COMPLETIONS

Fallon County, Cedar Creek: Montana-Dakota Utilities 284, NE NE 22-11n-57e, TD 2,310 ft., dry, top Judith River 844 ft., Eagle sand 1,435 ft., stray sand 1,878 ft., Niobrara shale 2,290 ft.

Teton County, Farmington Block: Texas 1 Burke, SW NE SW 11-25n-4w, TD 1,895 ft., top of Madison 1,890 ft., water at 1,892 ft., dry.

California Fields

(Continued from page 126)

5,780 ft., gun perf. 5,765-68 ft., probable new gas pool.

Los Angeles County, Las Llajas district: Standard 2-1 Brady, 13-3n-17w, dry, TD 2,569 ft.

Solano County, Lambie district: A. Oberholtz 1 Lambie, 22-4n-1e, dry, gray sand, no showings of commercial importance, lower structurally than Shell's Lambie wildcat which blew out, TD 5,605 ft.

San Luis Obispo County, Temblor outpost: Richfield 2-2 Temblor, 32-12s-25e, dry in hard gray sand, TD 3,050 ft.

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Located in the Great San Juan Basin. Oil pools now producing highest gravity crude known. HELIUM discovery. DEEP TEST UNDER WAY. Buy where the majors buy. Write for information. Harry S. Wright, Wright Bldg., Farmington, New Mexico.

3000 ACRES, 10 year leases, 10c rentals, in Harrison County, Indiana, 20 miles southwest of Louisville, Kentucky. Want Trenton test. Leo H. Graves, Phone 64, Farina, Illinois.

INDEPENDENT Oil Operator wants to drill several wells this year close to production. Interested only in acreage which has possibilities of extending a pool. Prefer depths of 2,500 to 3,500 feet but will consider deeper exceptionally attractive propositions. All must stand rigid investigation. Write to Box A-236, The Oil and Gas Journal, Tulsa, Okla.

WILL DRILL or finance several wells on producing lease or close to production. Send full particulars. Box 2631 Custom House Station, New Orleans, Louisiana.

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Texas, New Mexico, Oklahoma, Louisiana and Illinois.

Inquiries Invited

B. D. BUCKLEY

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LEASES AND DRILLING BLOCKS

ARKANSAS-Louisiana-Texas leases, twenty acres up. Dollar acre up. Owners, Box 1122, Little Rock, Arkansas.

LEASE BLOCKS, near major play. From 2,000 to 15,000 acres. Will deal blocks outright or will furnish geological report and quote price on completed well. In inquiring, explain exactly what you want. Box A-317, The Oil and Gas Journal, Tulsa, Oklahoma.

HOT lease for sale—160 acres NW Lubbock County, near Humble discovery SE Lamb County. $25.00 in cash, $25.00 in Oil. Get this while its cheap—Over 500 ft. of Dolomite pay sand in Humble well. C. L. Craig, Plainview, Texas.

DRILLING activities in this locality indicate that one of the largest oil fields yet discovered on this continent is about to materialize. 5 wells are now drilling at various depths from spudding to 3608 feet. Two more companies have secured lease blocks and preparing to drill. Oil and gas showings have already been found in three of the wells, all in formations favorable to accumulations of oil and gas in large quantities, and the drill may hit the big pay any time. We are employing this method to keep our many clients informed on oil developments in this locality and about lease acreage yet obtainable in proximity to drilling locations and at prices that should prove very profitable when commercial production is obtained. Investors desiring to secure close-in or off-set acreage should write immediately for our FREE booklet containing information on oil development possibilities in Maricopa and Pinal Counties, Arizona. Address P. H. Luud Engineering Company, Route 1, Box 1406, Phoenix, Arizona. THE DRILL MAY HIT THE BIG PAY ANY TIME.

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ESTABLISH yourself in well paying business by supplying drillers, refiners, and utilities with a well known water treating service. Some financial aid. Chemical Compound Co., Box 2222, Houston 1, Tex.

OF INTEREST TO OIL OPERATORS

If your production is settled and it has exceeded the oil reserves developed over a period of years, you undoubtedly feel your overhead is too high. Let me explain how it can be reduced with declining production. Oil Field Management, 189 Montague Street, Brooklyn 2, Room 808.

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ADDRESS WANTED

WANTED: Present address of O. M. Mason, formerly of Mt. Pleasant, Michigan, Pecos, Texas, New York, N. Y. and possibly Tulsa, Oklahoma. He was associated with Mason Oil Company, or Michigan Gas & Oil Company. Box A-309, The Oil and Gas Journal, Tulsa, Okla.